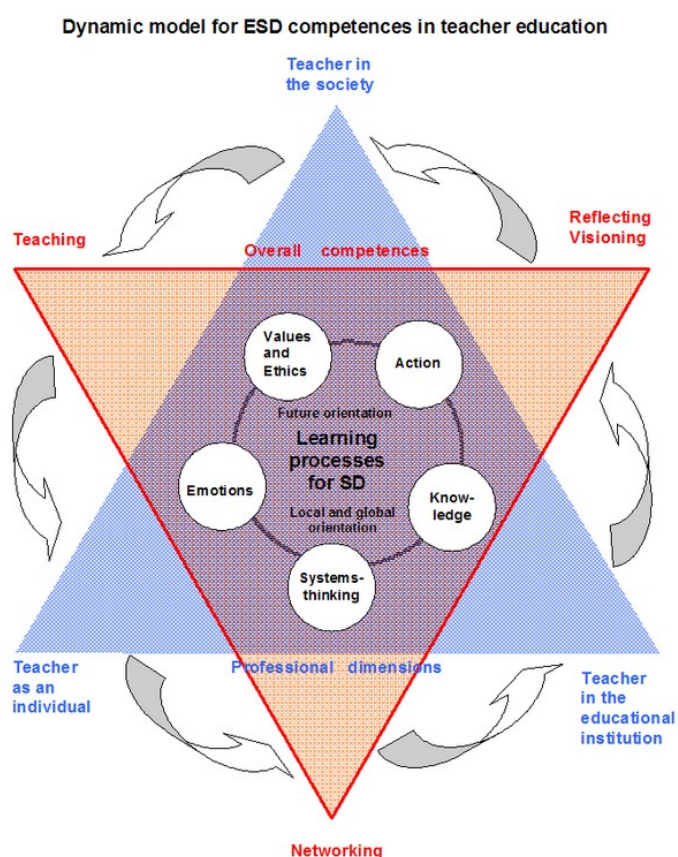


Competencies for ESD (Education for Sustainable Development) teachers

A framework to integrate ESD in the curriculum of teacher training institutes.



Socrates

Colophon

Competencies for ESD (Education for Sustainable Development) teachers.
A framework to integrate ESD in the curriculum of teacher training institutes.

Editor: Sleurs, Willy (ed.)

Comenius 2.1 project 118277-CP-1-2004-BE-Comenius-C2.1

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Brussels, January 2008

www.csct-project.org

About the CSCT-project and the partnership

About the CSCT

The CSCT project was developed as a response to the call of the UNECE Ministers of the Environment in 2003 for including education for sustainable development (ESD) in curricula from pre-school to higher and adult education.

In 2002 the international organisation ENSI (Environment and School Initiatives) developed the Comenius3 project SEED, which aimed to identify the implicit and explicit criteria inspired by values of Environmental Education, as used to guide, support or award Eco-Schools involved in incorporating principles and actions for sustainability in whole school plans. This research also involved identifying and documenting innovative case studies in this area. The information is published in the SEED/ENSI publication: “A Comparative Study on Eco-school Development Process” (Mogensen & Mayer, 2005). Stimulated by the comparative study, a proposal for Quality Criteria for ESD-schools is published subsequently under the title “Quality Criteria for ESD-Schools: Guidelines to enhance the quality of Education for Sustainable Development” (Breiting, S., Mayer, M. & Mogensen, F., 2005).

ENSI considers action research as an important instrument for curriculum innovation at school level, both of compulsory education as of higher education, such as teacher education. In 2006 the ENSI publication ‘Reflective practice in Teacher Education’¹ appeared which is structured around action research and evaluative case studies that focus on the aims of environmental education and action research as approach to develop teacher programmes for environmental education and education for sustainable development. After all, the integration of ESD in mainstream school curricula requires a thoroughly re-thinking of teacher training curricula.

The present Comenius-2-project, CSCT (Curriculum, Sustainable development, Competences, Teacher training) is an attempt to meet the call of the UNECE ministers of the Environment to offer curriculum models to teacher training institutes which are searching for attainable possibilities to integrate ESD in their curricula.

¹ KYBURZ-GRABER, HART, P., POSCH, P. & ROBOTOM, I. (Eds.) (2006) *Reflective practice in teacher Education*. Bern, Berlin, Bruxelles, Frankfurt am Main, New York, Oxford, Wien, 383 pp.

Within the ENSI family 15 partners, from 8 different countries, responded positively to the call which was clarified and discussed during the Comenius-2 contact seminar of 3-6 September 2003 in Szeged, Hungary. The department of teacher education of the Katholieke Hogeschool Leuven (Flemish Community of Belgium) was prepared to take the role of the coordinating institution.

An overview of the partners and their respective e-mail addresses is given below. More information about the project is available on the website www.csct-project.org.

We hope that the results of this project, together with the results of the SEED project and the ENSI publication on the reflective practice in teacher education, will contribute to the integration of ESD in mainstream curricula of both compulsory and teacher education.

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Sustainable development and education

Sustainable development

The Austrian film director Hubert Sauper describes in his film “Darwin’s Nightmare” in a dramatic way how a non-sustainable process is deteriorating the region around Lake Victoria in many ways. The whole process started above all with the introduction of the Nile-perch in Lake Victoria and the exploitation through foreign companies. A complex system of a broad variety of factors interrelate with each other and are leading to the ecological, economical and social catastrophe in this region. The film provided a typical example of what is referred to today as a ‘sustainability challenge’.

Fortunately there are also a growing number of international examples how to deal with such challenges in a sound way. Car-sharing cooperation e.g. are an example for the management of mobility. In Switzerland this bottom up-project started with small initiatives and developed to a nationwide organization. Advantages are visible in several domains:

- **Ecology:** reduction of grey energy of car-production, lower land use by parking lots and garages, availability of cars at numerous location, basically on railway-stations, you can use the train for larger distance.
- **Economy:** low costs for moderate users, creation of new jobs.
- **Social:** lower maintenance time, proliferation of the basic idea of sharing and how a society can organize this, less space for parking leaves areas to children to play.

This example shows how initiatives of small groups can initiate innovation. The same process could also be started by activities of schools.

What is sustainable development about?

In this chapter we will try to explain the meaning of sustainable development and describe its most obvious features.

One of the key features of the last decade has been the growing awareness of the process of globalisation. While only 13 articles about this topic were published between 1980 and 1984 the number of papers that refer to the same topic today, are almost uncountable (Dicken, 2003). Globalisation is manifesting itself on several levels: economic, ecologic and social. It is also becoming clearer to scientists and policymakers that these levels are strongly interconnected and are extremely complex. Globalisation offers many new opportunities but creates also new and often unexpected challenges and problems.

Furthermore, the impact for future generations may be very large but also very hard to estimate. The most famous problem considered from a global perspective is global warming. This problem has a clear ecological impact, but it also has significant economic implications. For instance, policy makers are now searching for alternatives to fossil fuel and they are considering options as diverse as nuclear energy and biodiesel. Both these options, however, will lead to new challenges: nuclear energy produces nuclear waste in the present and for future generations and centralizes economic power, while the increasing use of biodiesel may inspire many farmers to switch from growing plants which are used for food, to plants which produce oil that can be used as a fuel. Today, we feel the first effects as a dramatic rise of the food prices.

Global climate change can serve as a prototype of a sustainability problem, one which is characterized by a high degree of complexity, expressed by a strong interrelationship between ecological, social and economic dimensions, which have important consequences for future generations; furthermore there is the uncertainty about the routes that should be followed to find a solution.

Historical development of the concept of sustainable development

Club of Rome

In 1972, the Club of Rome shocked the world with the report 'The Limits to Growth'. The main conclusions of this report were that if economic-development-as-we-know-it continues, society will run out of non-renewable resources before the year 2072 with the most probable result being 'a rather sudden and uncontrollable decline in both population and industrial capacity'. It also argued that piecemeal approaches to solving individual problems would not be successful. Notwithstanding this report received a lot of critique, mainly because the predicted environmental disasters failed to occur.

Brundtland Report

In 1987 the World Commission on Environment and Development (WCED) submitted the report 'Our Common Future' to the United Nations General Assembly. This report is better known as the Brundtland Report, after the Chair of the Commission and former Prime Minister of Norway, Gro Harlem Brundtland.

The aim of the World Commission was to find practical ways of addressing the environmental and developmental problems of the world. In particular, it contains three general objectives:

- To re-examine the critical environmental and developmental issues and to formulate realistic proposals for dealing with them.

- To propose new forms of international co-operation on these issues that will influence policies and events in the direction of necessary changes.
- To raise the levels of understanding and commitment to action of individuals, voluntary organisations, businesses, institutes, and governments.

In this report the concept 'sustainable development' was defined as:

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

This definition sets out the two fundamental principles of intra-generational and intergenerational equity, and contains the two 'key concepts' of needs and limits. The concept of 'needs' demands that 'overriding priority' should be given to the essential needs of the world's poor, both from the North and South. Poverty and the unequal distribution of resources, the growing population and its expanding consumption are considered as major causes of environmental degradation: 'Sustainable development requires meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life' (WCED, 1987, p. 44). The Report stresses that these goals can only be achieved if consumption patterns in the richer countries are readjusted. Secondly, the concept of limits recognises that the current state of technology and social organisation imposes limits on the ability of the environment to meet present and future needs, so we must moderate our demands on the natural environment. Yet the Report rejects the anti-growth arguments of the 1970s, asserting that 'Growth has no set limit in terms of population or resource use beyond which lies ecological disaster' (WCED, 1987, p. 45). Indeed, Brundtland demands a revival of growth in developing countries to help alleviate poverty and provide for basic needs, although it seeks a more 'eco-friendly' type of growth that is 'less material- and energy-intensive and more equitable in its impact' (WCED, 1987, p. 52).

A central, distinguishing feature of sustainable development as a policy paradigm is that it shifts the terms of debate from traditional environmentalism, with its primary focus on environmental protection, to the notion of sustainability, which requires a much more complex process of trading off social, economic and environmental priorities.

Nevertheless, until today sustainable development is very often considered a synonym of protection of the environment (Evers, 2005).

United Nations Conference on Environment and Development, Rio de Janeiro 1992

The United Nations Conference on Environment and Development, which took place in Rio de Janeiro in 1992, and which was strongly influenced by the terminology that was introduced in the Brundtland report, was an important milestone for making the concept of 'sustainable development' more concrete (Scott & Gough, 2003). Besides the great

number of participants and the diversity of their origin, during the debates marked contrasts between representatives of the northern -generally richer- hemisphere and the poorer southern hemisphere came to the surface.

Representatives of the northern hemisphere were, in the first place, concerned about the growing importance of environmental problems which are a real threat for the ecosystems, while representatives from the developing countries were mainly interested in fighting poverty. According to the representatives of the developing countries, consumption patterns of people from the northern hemisphere are responsible for these problems and they condemn every imposed form of environmental control in the southern hemisphere, as this would restrict the already limited consumption possibilities of their inhabitants (Jackson & Michaelis, 2003). This discussion eventually led to the consensus that sustainable development should be considered as a domain of research and action and that it should be considered a wanted policy domain that we should aspire to (Elliott, 2006).

The results of the UN Conference which are most recognized by the large public are the *Rio Declaration on Environment and Development*, the *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, the *Convention on Biological Diversity* and the action programme of *Agenda 21*. Chapter 36 of Agenda 21 is dedicated to promoting education, public awareness and training.

Ten years after the top conference in Rio de Janeiro, a new conference was organised in Johannesburg, which was intended to stimulate the member states to make efforts to revitalize the agenda of sustainable development and to meet the challenges which emerged since the UN conference in Rio. Despite the high expectations regarding the conference, no new big agreements were made and only a new implementation plan was developed. However, the foundation was laid for a UN Decade for Education for Sustainable Development from 2005 to 2015. This resolution 57/254 was voted the 20th of December 2002. The UNESCO received the responsibility to promote the Decade and to develop an implementation scheme. This document served as the basis for the UNECE to develop an implementation strategy, which allows policy makers to design an appropriate strategy for their own state.

Features of sustainability challenges

Sustainability issues are intricate because social, economic and ecologic aspects are strongly interwoven. Simple predictions on the basis of linear causal relationships are therefore very rare. The following example may illustrate this.

People become more and more convinced about the fact that within a few decades we will run out of fossil fuels, which will undoubtedly pose enormous problems for the economic growth of many both developing and developed countries, and also impact on future generations. Consequently, there is a growing research activity, searching for alternative energy resources, especially for the transport sector where petrol is of vital importance.

Some plants that produce oil-bearing seeds can be used to produce a substitute for fossil fuel. The advantages are quite clear: theoretically it forms an unlimited source as it depends on solar energy, and it is CO₂-neutral, which is in agreement with the Kyoto protocol. However, though at first sight this ‘solution’ might look very promising, rapidly it became obvious that it leads to very unsustainable developments too. Considering the economic importance of these fuels, it seems clear that big trans-national corporations will invest heavily in this sector. Growing plants require the availability of large surfaces of land, which become less available in industrialised countries, but are richly present in developing countries. Many policy makers expect therefore that particularly large areas of untouched natural reserves -such as the Amazon area- will be sacrificed to be used to grow maize or oil producing plants. Local populations, which strongly depend for their living conditions on the local biodiversity, will be the first victims of these developments. Furthermore, whilst the trans-national concerns will make significant profits from such operations the local populations will only benefit slightly, if at all, from the conversion of their original natural environment into large agricultural areas.

This example illustrates another feature of sustainability issues, viz. the uncertainty that policy makers meet when taking decisions with respect to them. After all, the ways to unsustainable solutions are usually well known, the ways to sustainable development however are covered with many uncertainties. Many solutions, which at first sight, look very promising, bear many risks both for the present, and the future generations. Therefore, sustainable development involves, by definition, a continuous learning process.

The risk society and the theory of reflexive modernisation

In 1992, the year of the UN conference in Rio, the English translation of Ulrich Beck’s book *‘Risikogesellschaft auf dem Weg in andere Moderne’*, appeared as *‘Risk Society: Towards a New Modernity’*. In this work, the author presents an analysis of the transition from the pre-industrial society, via the modern society to the second modernity (Beck, 1992). This analysis led him to describe the present society as a Risk society and to introduce the concept of reflexive modernisation.

Up to the first half of the 18th century, traditional communities existed in which traditional institutions, such as the church, the family, the village ... gave shape and sense to people’s life. Gradually, and in the name of individual freedom and autonomy these traditional institutions and structures became less influential and were replaced by new ones: new industrial communities emerge and the tie with the family becomes restricted to a small number of very close relatives. The nation replaces the village and takes over part of the responsibility for the organisation of peoples’ lives. In exchange for more welfare, people choose the organisations and structures to which they prefer to express their loyalty. At the same time science develops exponentially and individuals have an almost unlimited faith in new scientific knowledge. From the Industrial Revolution

onwards, educational systems in the industrialised world are increasingly designed stimulate economic growth (Wielemans, 2003).

The increasing large-scaled industrial activities cause side-effects which become obvious only many years later, for besides the negative impact on the natural environment - and consequently on people's health - the industrial activities threaten to exhaust the natural resources in the short or medium term. From the middle of the 20th century, these effects were clearly visible and for the first time, and from different sides, the alarm was given. It is clear from incidents such as the nuclear disaster at Chernobyl, from the many environmental disasters with oil-tankers and from the growing awareness of global climate change that the scale of environmental disasters is greater than ever before and that these disasters very often have a global character. Events in other fields such as crashes on the stock-market and the global risk of terror attacks demonstrate that we do live in a 'global village'.

Alongside the emergence of increasing risks, the end of the 20th century and the first part of the 21st century is characterised by a decreasing faith in scientific knowledge. More often, scientific studies contradict each other regarding the same issue as is clearly illustrated by the studies about the possible cause of global warming. For the average citizen, it becomes increasingly difficult to critically select from the impressive amount of information that reaches us. Furthermore, scientific knowledge is fallible, which makes every form of scientific knowledge more or less tentative and uncertain.

Ulrich Beck uses the concept of *reflexive modernisation* to describe the reflection on and the lack of scientific knowledge which characterises the present period.

Cultural theory as an interpretation framework for sustainability issues

Individuals will make interpretations of the environment, taking into consideration the aspects of uncertainty and the possible risks involved. The *cultural theory*, developed by Thompson and his collaborators (Scott & Gough, 2003), presents a useful framework to classify the different possibilities people use to make interpretations of their environment.

According to some sociologists, there are two dimensions along which people make interpretations of their environment: the first dimension relates to the degree people are convinced about the importance of individual actions or collaboration, and the second one relates to the degree people are convinced about the freedom they have to act (Gough, 2002). On the basis of these variables, four archetypes are distinguished: the hierarchical, the individualistic, the egalitarian and the fatalistic.

A hierarchical interpretation of the environment refers to little freedom of action and a strong emphasis on collective action as the best strategy to find a solution for sustainability challenges. The natural environment is considered a complex system which is strongly regulated by (natural) laws; these people are confident in science, which is -

according to them- able to unravel this complex system of (natural) rules and laws. As a consequence, this vision supposes behavioural rules, which lead automatically to pro-environmental behaviour when they are respected by the citizens.

The individualistic interpretation emphasises the importance of the freedom of action and advocates an individualistic attitude when confronted with sustainability challenges. For these people, the laws of the free market also apply to environmental matters; nature is considered in the first place, as a source which allows people to survive. The free market regulates the relationship between humans and the environment.

The egalitarian interpretation attaches much importance to the individual freedom people have to act and their focus on collective responsibility to find solutions for sustainability challenges. Local participative structures and organisations are therefore extremely important to reach their goals. They consider the natural equilibrium as very delicate, and believe that it can be disturbed very easily by human action. According to the egalitarian interpretation, principles of justice and equity are strongly linked to pro-environmental behaviour.

Finally, some people interpret sustainability challenges in a fatalist way as they believe the influence of the average civilian to change the existing situation is extremely small. Furthermore, sustainability challenges are not of first priority for these people.

Jackson and Michaelis (2003) use the same *cultural theory* to classify consumer behaviour with respect to the ongoing debate about 'sustainable consumption'.

The interpretations people make of their environment are socially influenced and can change from situation to situation, even within a short time span.

The *cultural theory* shows that people make interpretations of issues of sustainable development in different ways, and consequently there will be many different ways to find solutions. This diversity is the basis of the current pluriform society in which different visions with respect to sustainable development are present.

Reflexive modernisation and sub-politics

Starting from his theory of reflexive modernisation, Beck draws the conclusion that in the period of the new modernity political institutions become conscious of the uncertainty and the lack of scientific knowledge, which means that decision making today is always connected to a certain degree of uncertainty (Lijmbach *e.a.*, 2000). Besides this uncertainty, the new modern society is characterised by the absence of common norms and values which can be directional for decision making. This pluralism of norms and values results in people holding different interpretations on issues of sustainable development which leads to different solutions being proposed and to a range of diverse coalitions which support these different solutions. Beck calls this phenomenon sub-politics

and it is strongly connected to the disappearance of the monopoly of scientific knowledge as the main guide to finding solutions for sustainability challenges. The new societal structures have been shaped bottom-up as illustrated by the emergence of several organisations, characterised by flexible and dynamic structures and goals. These organisations are usually able to offer different solutions to those proposed by traditional bureaucratic institutions (Elmose & Roth, 2005). Each day new examples of sub-politics emerge. The most famous example is the response to globalisation, where so-called 'activists' have reacted by creating trans-national sub-politics of their own, with multi-issue agendas and diverse action repertoires as defining elements.

The theory of reflexive modernisation contends that western industrial societies have entered a second, reflexive phase of modernity. While first modernity has modernised tradition, second modernity modernises modernity itself.

Education for sustainable development

Societies generally expect educational systems to prepare young people for their future professional life and/or continued studies. The educational system is seen as having a socialising role and is expected to contribute to preparing young people to take up their responsibilities in helping to shape the complex society in which we all now live.

It is because of the latter reason that, by the mid sixties and early seventies, so-called adjectival educations -such as environmental education, health education, citizenship, peace education etc.- were introduced into the curriculum of many educational systems.

However, the risk society requires competences from their citizens which will markedly differ from the competences citizens needed about three decades ago. The introduction of issues of sustainable development in the curriculum of both primary and secondary education is therefore strongly recommended by several international organisations, such as UNESCO and UNECE.

Above, we described issues of sustainable development as complex, because of the tight connections between social, economic and ecological aspects, but also because many proposed solutions, may lead to new (global) risks.

This implies that education for sustainable development requires at least a holistic approach, rather than the reductionist approach which is common in traditional educational systems. Indeed, a reductionist approach can often be the origin of these problems. It follows that, if we desire a consensus rather than a (usually messy) compromise, then sustainability challenges need to be approached at a systemic level. (a.o. Sterling, 2001; Tilbury *e.a.*, 2005).

New challenges for education in a risk society?

Shifts in the curriculum are often the result of radical social changes or new societal challenges, which are considered as very important by the decision makers. Very often education is used by policy makers as an *instrument* to induce behavioural changes into a 'socially desirable direction'. The diversity of adjectival educations can be largely explained in this way. Therefore it is not surprising that some people think about introducing a new adjectival education, often called '*education for sustainable development (ESD)*'.

Most researchers who are involved with ESD hold that an instrumental vision on ESD by definition cannot be reconciled with the definition of education. In any case there is a strong consensus that schools are not organisations that can be used for solving societal problems (Jensen & Schnack, 1997; Scott, 2002).

According to Scott (2002), ESD should encourage schools to stimulate their pupils to reflect on their own lifestyle regarding sustainability issues. It implies that they should be able to reflect on the concept of sustainable development with respect to decisions they take in the context of their own life. Lijmbach e.a. (2000) consider the role of education as an instrument for the development of autonomously thinking persons. They strongly emphasise, together with other researchers (Rauch, 2004) a critical reflection of the different visions on sustainable development and even on the desirability of sustainable development.

Lijmbach e.a. (2004) consider education as 'life political formation' ("*levenspolitieke vorming*"), aimed at bridging the gap between the way social institutions and organisations adapt to the present social and scientific complexity, changes and uncertainties and the way individual citizens deal with it.

This means that education -in general- should aim to help the student to (Lijmbach e.a., 2000):

- Autonomously reflect on and gain insight in his/her own and someone else's situation, and the degree to which these situations are interconnected and how they are determined.
- Learn to critically value situations.
- Learn to reflect autonomously about acquiring insight about possibilities and limits of personal and collective responsibility.
- Learn to critically reflect on possibilities to change or to maintain situations.
- Learn to make personal and social choices and learn to take responsibility for the choices they make.

Using Klafki's definition of '*Allgemeinbildung*', Elmore and Roth (2005) formulate three competences, specifically aimed to deal with living in a risk society:

- The competence to understand and to change his/her own live conditions.
- Competence to participate in collective decision making.
- Competence to show solidarity with those who are unable to control their living conditions because of a diversity of reasons.

Education for sustainable development: a new adjectival education or a regulative idea?

For some researchers, involved with curriculum development, the prominent position of sustainable development on many national and international agendas is a sufficient reason to introduce a new and distinct adjectival education in the educational system.

However, there are enough reasons not to do so. The most important reason is that 'sustainable development' is a continuously evolving concept. Human relations with the environment are extremely complex and dynamic (Scott & Gough, 2003). People and organisations learn each time they have to adapt to the changing environment, and the environment responds to the changes of human behaviour and the activities which follow from these changes. Following Richard Norgaard, Scott and Gough (2003) this process is generally referred to as a co-evolution between the society and the environment. There does not exist a package of knowledge and skills, that when properly applied, leads automatically to a sustainable society.

Rauch (2004) considers 'sustainable development' as a regulative idea, which can be considered as an ideal people can strive for, but which inevitably can never be fully realised. Regulative ideas -such as justice, integrity etc.- serve as organisers to connect them with normative aspects, and therefore they are very useful as heuristic structures to reflect on. They give direction to research and learning processes and they can be seen as kinds of pre-concepts, without which no meaningful questions can be asked or problems can be identified.

Some authors consider sustainable development as a guide which is always present in the background and which gives direction when looking for solutions of sustainability issues (Kyburz-Graber, 2003).

In this sense, sustainable development can be considered an ethos that for every citizen, teacher and pupil should always be present at the back of their minds, when taking decisions, at least when they are convinced about the desirability of a sustainable society.

Therefore, existing adjectival educations can be used as entrances to approach issues of sustainable development. Environmental education emphasises environmental problems, but if teachers have the intention to take the issue of sustainable development seriously, they will also link the issue to the economic, social, cultural and political aspects.

Some teachers already made the link between these aspects, when dealing with issues of environmental education, even before the concept of sustainable development was raised in education.

Thus, although we do not advocate an independent adjectival education for sustainable development, the approach we recommend does mean that a teacher who consciously wants to deal with sustainability issues in the classroom, needs specific knowledge, skills and competences. Also new educational teaching and learning methods may facilitate ESD and in this way they can be used as a lever for educational innovations.

This is, amongst others, the major objective of ENSI, an international non profit organisation to introduce new educational methods and to stimulate new types of collaboration and the development of so called dynamic qualities of learners.

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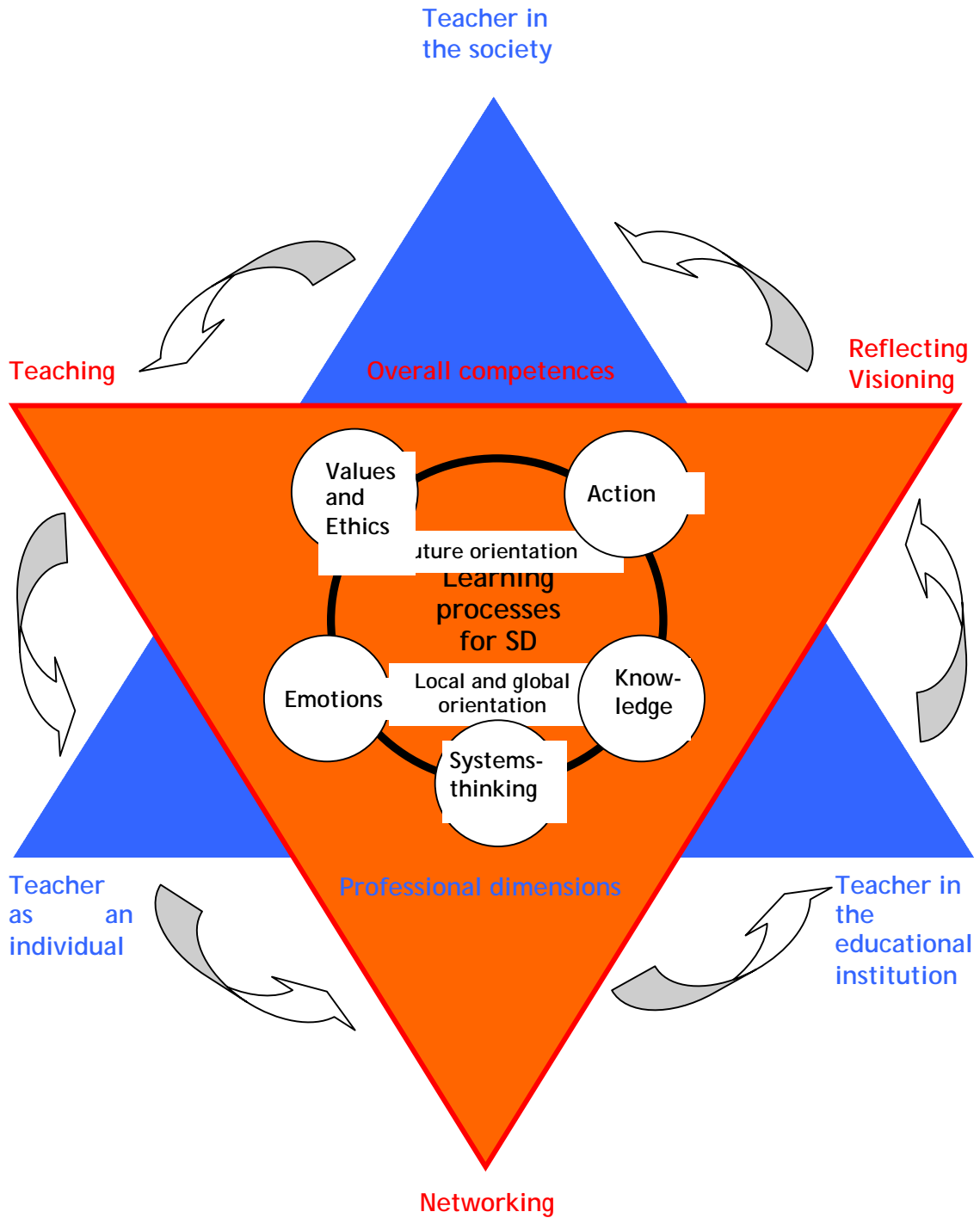
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How to read the model

CSCT framework Dynamic model for ESD competences teacher education



Blue triangle: Professional Dimension

We have to move beyond the idea of the teacher as an instructor. We rather have to envisage teachers as individuals who are in a dynamic relationship with their students, their colleagues and the wider society. It is within this dynamic relationship that we create the conditions that enable genuine learning to develop and progress in ESD. This means that teachers are no longer simply the communicators of knowledge, but members of an institution, which has a collective focus on the way all its members learn and develop, and all of those people are involved in the dynamics of a society that is seeking to confront the issues of sustainability. For all these levels teachers need specific competences, which are explained with the five domains. In addition to these overall competencies are needed.

Red triangle: Overall Competencies for ESD

There are three overall competencies:

- Teaching.
- Reflecting / visioning.
- Networking.

ESD needs a different and more constructive focus on *teaching*. Teachers have to gain the insight through constructivism, that acquiring competencies is a self-steered and active process, which can be fostered but not created.

For example communication, the first competence, needs to promote more of a balanced dialogue between teachers and learners and between learners themselves. This means that the traditional tasks undertaken by teachers such as teaching, instructing and communicating will change as ESD develops. Besides the communication within the educational institution publication of projects and efforts are crucial (exhibitions, theatres, songs, cabaret books, public media, web-pages ...) so that parents and the community is invited to take part in this school-process.

The second two competences have even greater emphasis in ESD, because ESD has to take into account future orientation as well as local and global orientation. *Visioning* and creating new perspectives are important tasks because the transformative role of education is a key issue in ESD. Action will change as a product of *reflecting* and visioning, because such future action will take into account reflection on what has happened, and use this as a means to envision a transformation that will create new solutions and new ideas. Action research is an effective tool to foster such reflection and visioning in order to improve teacher competencies.

ESD as a common concern has to be realized within an interdisciplinary team. No one can do ESD alone, it is a common effort and everyone brings his or her strengths and weaknesses to the project. *Networking* with other partners in and out of school is also necessary in order to create a learning environment with an ongoing spiral containing, visioning, planning, acting and reflecting. ESD concerns real life problems and issues and requires the creation of learning opportunities in society. Also with networking publishing competencies are important (compare with the section on teaching).

Competences for communicating in an effective way and organizational skills are referred to in the blue triangle professional dimensions and not explicitly mentioned here.

How to read the model

The relationship between the professional dimensions and the overall competencies refer to all the possible combinations. The two triangles should be regarded as twistable. Opposite angles have the strongest relationship with each other.

Examples:

- The teacher in the educational institution needs especially competences in teaching, communicating and mediating on various levels such as: with students, teacher colleagues, leadership and educational board.
- But this is not sufficient. To do ESD you need as an individual teacher to be able to create and formulate visions based on reflective activities.
- The teacher and the educational institution are part of the society and there is always a given relation between the three. ESD requires openness, understanding and action, which are relying on competences such as networking, cooperating and publishing.

But also:

- The teacher has the competence of organizing and fostering networking while teaching through cooperation between classes and students of different levels.

Function of the five domains of competencies

In teaching and learning for ESD, all five domains (knowledge, systems thinking, emotions, ethics and values and action) have to be applied to each of the professional dimensions and they also relate to all overall competences.

Finally the content of ESD has to be related to the future development and to local as well as global context.

We invite you to look at some of the case studies to find out which domains are especially fostered on the different professional levels but also in connection with the overall competencies.

Development of the dynamic model for ESD competences in Teacher Education

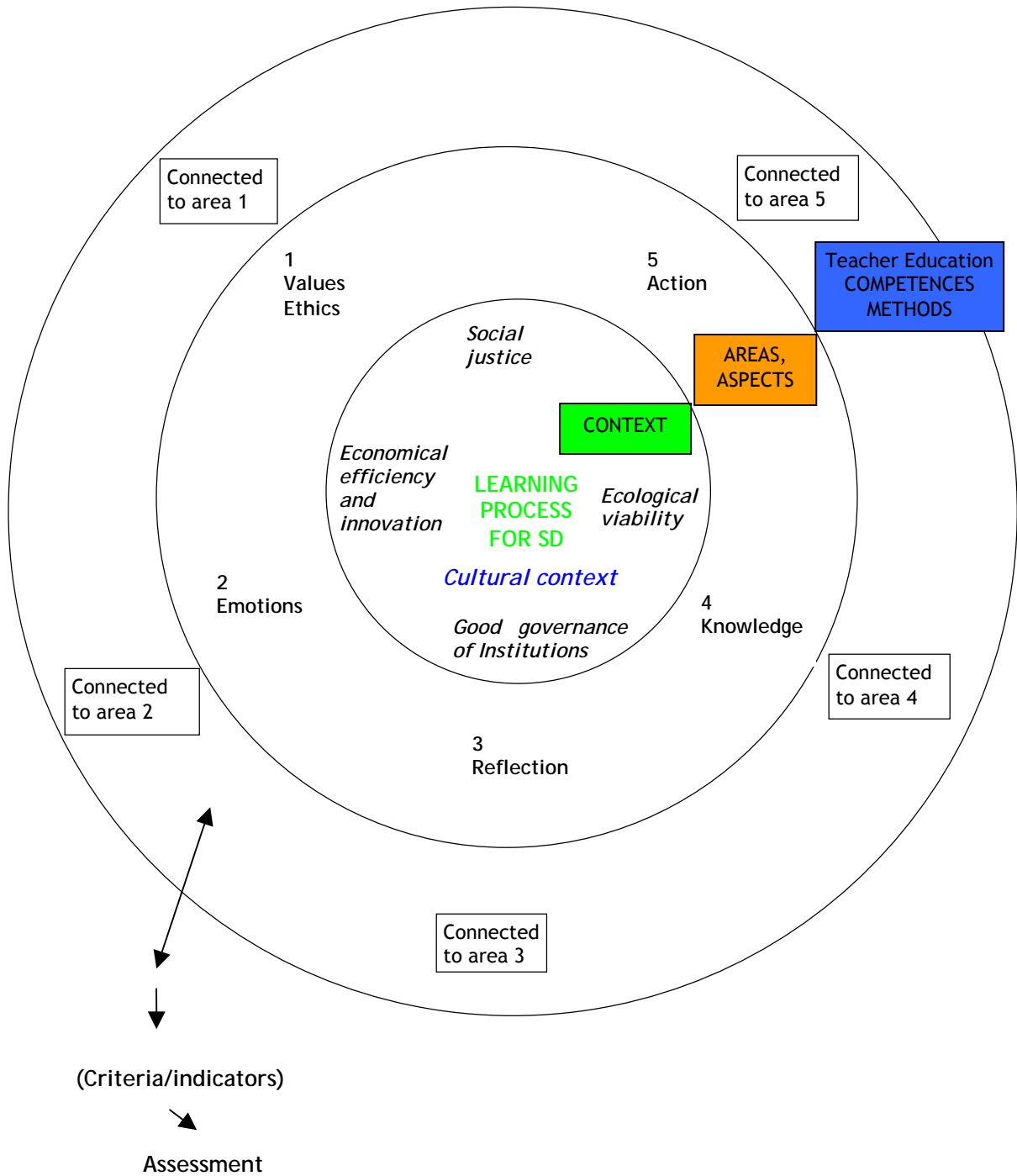
The CSCT competence model was developed by the whole international group in a three year long process both at workshops and discussions at the meetings and in between. The following pages show three main steps of the competence model developed at the meetings in Szendendre (Hungary) 2005, Barcelona (Spain) 2006 (Spain) and Leuven (Belgium) 2007. The meeting in Klagenfurt (Austria) 2007 was more oriented towards the case studies.

A comparison of the three stages might show inter alia:

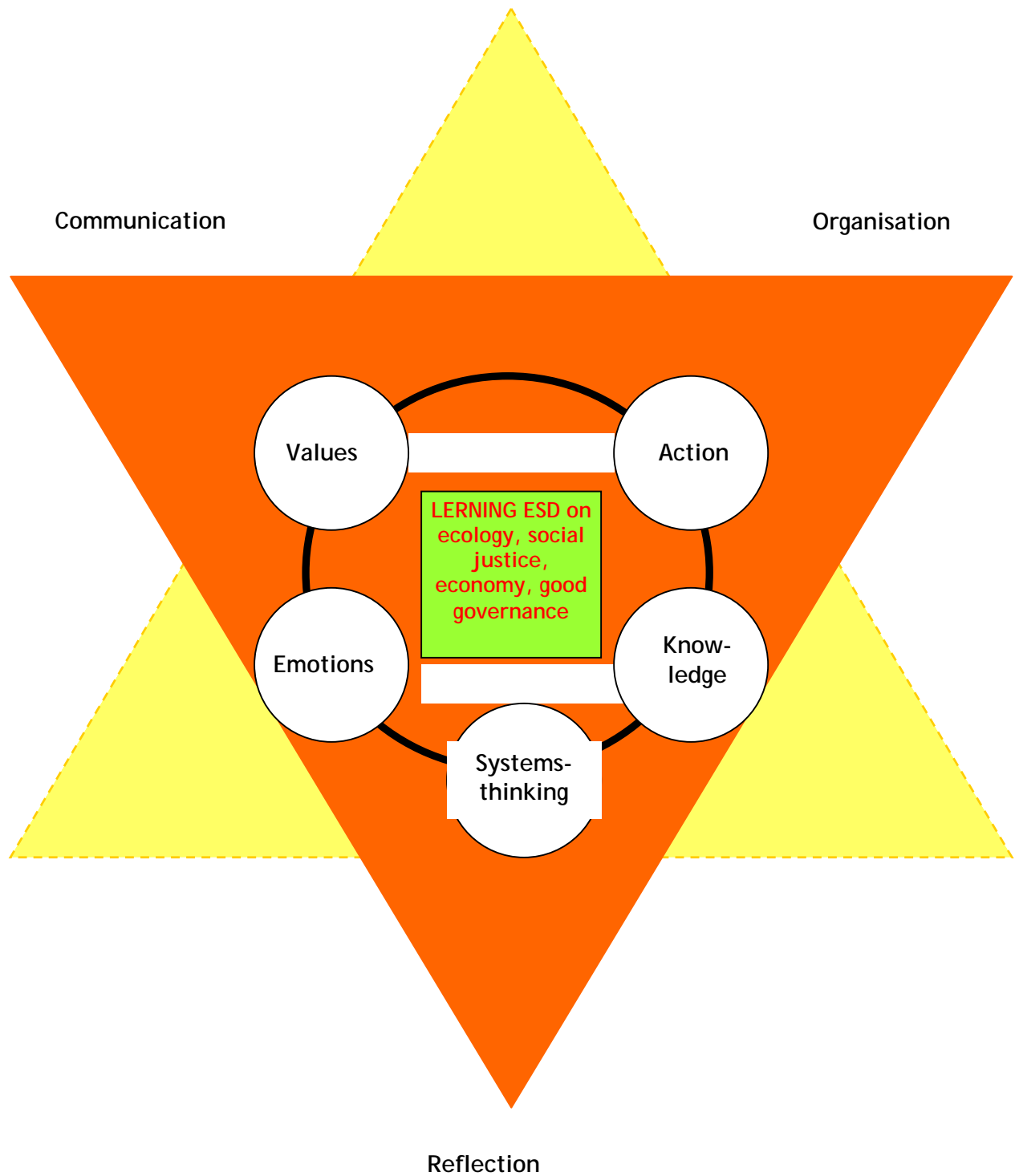
- The second and third versions differentiate between the core elements of competences in ESD and framework aspects like overall competences and general professional dimensions of teacher work.
- This is a trial to structure the many elements which seem important for ESD and make the chart clearer to the reader although it is hard to make complex inter-relations easily readable.
- In the last version we tried to combine the images of structure (triangles) and dynamic features (arrows). This refers to the theoretical concept of the model: competences for ESD in teacher education have to develop while planing, implementing and reflecting initiatives. For this process the modell offers guiding elements or reference points.

The central element is learning for Sustainable Development. The group was quite clear about this core principle when talking about competences for ESD already at the Fano meeting 2005. This element „survived“ changes of the charts.

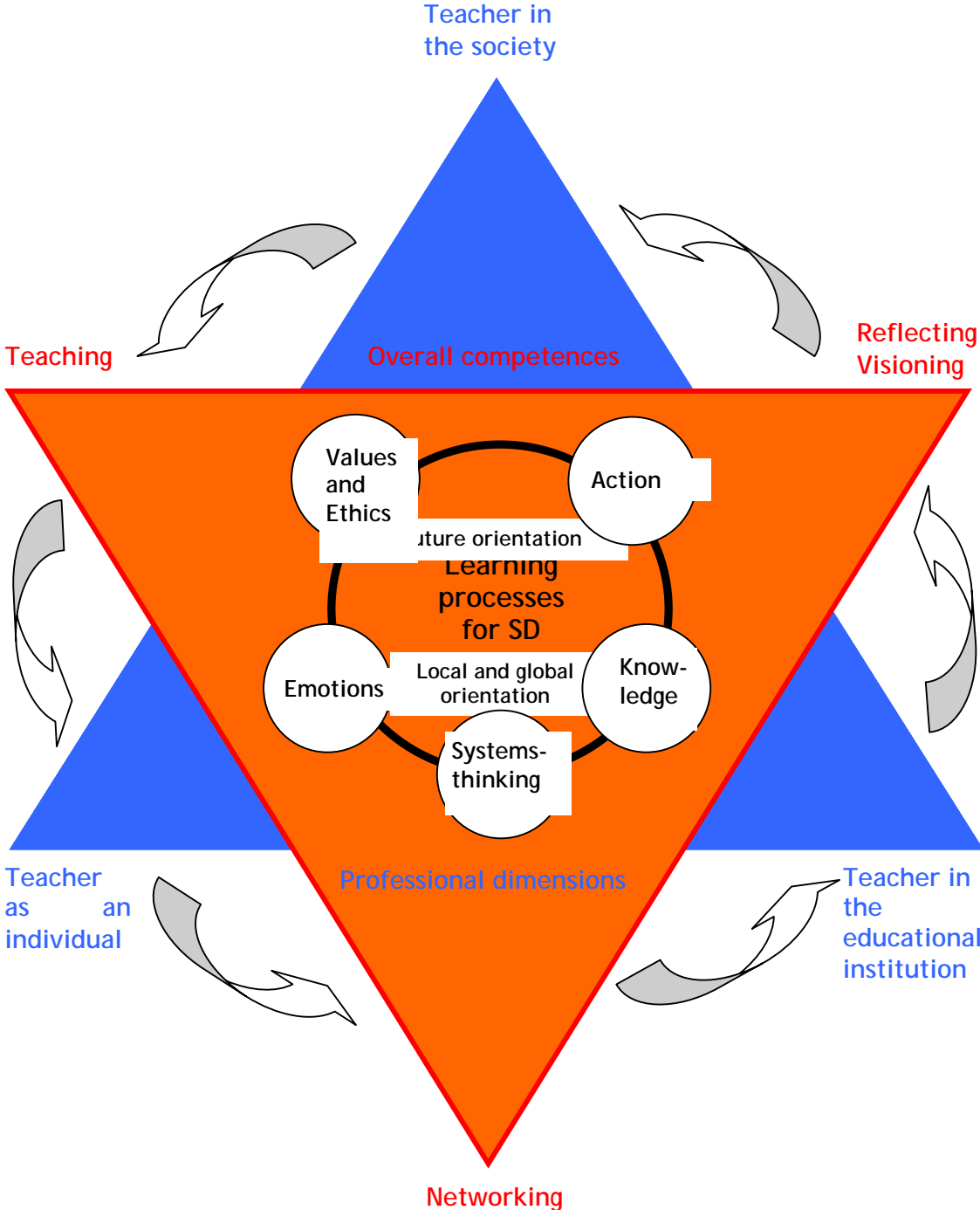
Szendendre 2005: Clusters for developing competences for ESD



Barcelona 2006: CSCD Competence Modell



Leuven 2007: Dynamic model for ESD competences in teacher education



Competence Concept

The concept of 'competence': from input tot output oriented

This text is mainly based on the concept of 'competence' developed in: RAUCH, F., STEINER, R., & STREISSLER, A. (2007). Kompetenzen für Bildung für nachhaltige Entwicklung von Lehrpersonen: Entwurf für ein Rahmenkonzept. [*Competences for education for sustainable development for teacher students: a conceptual framework*]. In: B. BORMANN, & G. de HAAN (Eds.), Kompetenzen der Bildung für nachhaltige Entwicklung. Operationalisierung, Messung, Rahmenbedingungen, Befunde (S. 141-158). Wiesbaden: VS Verlag. (In German).

The competence concept has been object to discussion for a long time. Particularly, the switch from input to output orientation, with the aim to measure educational gains has been discussed. Educational planning of contents and methods (input) by the teachers for the learners cannot be done anymore without stating which learning goals are to be aimed, which competences (output) the learner should acquire and how these goals and competences can be reached. This shift of paradigm is strongly related to the economic thinking by the educational policymakers about the concept of accountability, which gave origin to league tables of schools and universities and the audit cultures. Two important examples, which confirm this trend, are the PISA and TIMSS comparative studies.

Competences and education of learners

The last years there is an ongoing discussion about output oriented models and about basic competences for teachers. The reason for this focal shift was the insufficient quality of teacher education. For example, Hascher & Altrichter (2002) describe teacher education in Austria as a 'conglomerate of unconnected knowledge'.

Some research projects about teacher education clearly show that teaching, which is the core business of the teacher, often receives much less attention compared to domain knowledge, such as biology, geography etc. Often, the content of a course is strongly influenced by the lecturer's preference and is not necessarily oriented towards the future praxis of the teacher student (cf. Oelkers & Oser, 2000; Oser, 2002; Terhard, 2002).

In recent discourses about educational research, it is frequently reported that the message of professionalism about the core business of education insufficiently reaches the teacher student. While there is a growing consensus about the meaning of learning competences as a prerequisite for educational quality, the integration of co-responsibility for school development and for further development of professionalism is a rather new phenomenon.

Krainer (2003) introduces four dimensions for professionalism -action and reflection, autonomy and networking - which help to grasp the actual trend for more team and project work, involvement of parents and the school environment, even as more cooperation with partner institutes and professional communication. Also Stern and Streissler (2006) found in their empirical research project about professional development of Austrian teachers in the domain of natural sciences, that in the different areas of action of the teachers very different competences are needed. While in the classroom pedagogical, psychological and didactic skills are important, in the school and the community, teamwork, cooperation, school development and public affairs play an important role. Reflection on the teacher's actions, conscious steering of his/her own professional development, 'reflection' about work attitude and reflection about the concept of education, are also features of the professionalism of teachers.

Problem fields of the concept of 'competence'

When dealing with the concept of competence some problems are encountered: the concept of competence has been used in different ways. In the Austrian discussion about education, competences were understood as key qualifications, social competences, 'soft skills', cross-curricular competences or 'dynamic skills' (Lassnigg, Mayer & Svecnik, 2001). Often the concept of competence was confused with 'qualification' or 'standard'.

The OECD (2005) differentiates between three categories of competences:

- key competences for the interactive use of tools, such as knowledge, media and resources;
- the competences for acting autonomously;
- competences for interacting within socially heterogeneous groups.

The necessity to think and act in a reflective way is considered a central element in this competence. Reflexivity does not just mean the skill to act routinely when dealing with a particular situation, but also to deal with changes, to learn from experiences, and to think and act critically (OECD, 2001).

In the UNESCO report *'Learning: the treasure within'* (UNESCO, 1996), Jacques Delors (1996) recognizes four pillars for education of 21st Century: learning to know, learning to do, learning to be and learning to live together. They partly correspond with the frequently used competence fields: domain competences, methodological competences, personal competences and social competences (Erpenbeck & Rosenstil, 2003).

De Haan (2001) introduced the concept of '*Gestaltungskompetenzen*' ('shaping competence') and made it a central concept of the BLK-21² programme in Germany.

Gestaltungskompetenz refers to the skill of applying knowledge about sustainable development and recognizing problems about non-sustainable development. This means, being able to draw conclusions about ecological, economic and social developments and their mutual dependency, based on analyses of the present and studies about the future; and starting from these conclusions he/she should also be able to take decisions which he/she can bring into action politically both as an individual and as a member of a community.

Weinert (2001) is warning of two 'assumptions': that a small set of key competences is sufficient and the gain of a broad knowledge becomes obsolete and secondly that the new skills can be used automatically on the 'right' place. This refers to the problem of transfer: to which measure is it possible to transfer qualifications, acquired in one particular situation, to another situation?

A fourth problem relates to the focus on the individual who should acquire competences during his or her whole life time in order to exist in the neo-liberal labour and community model. This view tends to require a 'shift of responsibility' to the individual. Structural aspects and particularly poor learners in the 'mainstream' educational system and in the system of further education are not supported. Without changing the priorities on the systemic level of the educational system, the acquisition of certain competences, such as interdisciplinary thinking and teaching or skills such as communication and project management, remain an 'accidental' side product of the educational system, instead of putting them more central for all teachers and learners by changing the curricula and the introduction of new teaching principles or the reinforcement of already existing teaching principles.

A fifth problem arises out of the norm setting of the concept of competences. Even when curricula and teaching principles are reoriented from input to desired outputs, it doesn't tell anything about the actual practice of the teachers and learners. As long as the educational culture -and in particular the assessment culture- will not change, the concept of competence will remain a modern meaningless phrase.

Furthermore, competences do not exist for themselves but always as a look to a wanted outcome.

² BLK: Bünd-Länder Kommission (Bund-Länder Commission for Educational Planning and Research Promotion)

Competences are also social constructs, which are based on values and ideological assumptions (Rychen & Salganik, 2003). Defining competences is also an ethical and political assignment. A possible consequence may be that the competence oriented approach prescribes unintended or intended paradigms of the neo-liberal market and the Western community systems.

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Five domains

five crucial perspectives on competencies in education for sustainable development

Our concept of competences

Since several years the term „competence“ is used in an inflationary way and without distinctive differentiation, not only within the working context or in the connection with educational issues but also in personal and societal everyday life.

The definition of what is hidden behind the term of competency proves to be enormously difficult, and moreover different terms often are used synonymously.

Rychen & Salganik (2003), editors of the final report of the OECD-project „Defining and Selecting Key Competencies“ (DeSeCo), who designed a conceptual framework for the definition and evaluation of key-competences, state: „In public discourse and sometimes also in specialized literature, there is a tendency to use terms such as skills, qualification, competence, and literacy either imprecisely or interchangeably, in order to describe what individuals must learn, know, or be able to do to succeed in school, at workplace, or in social life.“ (Rychen & Salganik 2003, p. 41). They specify the concept of competence as “the ability to successfully meet complex demands in a particular context through mobilization of psychosocial prerequisites (including both cognitive and non-cognitive aspects” (ibid), and as a „complex action system encompassing cognitive skills, attitudes, and other non-cognitive components“ (ibid, p.51).

Rychen and Salganik also point out the danger of reducing the competence concept to only one of it's dimensions, as it often happens when assessing competences in school tests as well as in large-scale assessments, where it is traditionally restricted to cognitive components. Competent performance or effective action implies the mobilization of knowledge, cognitive and practical skills as well as social and behavior components such as abilities, emotions, and values and motivations. A competence - as a holistic notion - is therefore not reducible to its cognitive dimension (Rychen & Salganik, 2003).

According to Jacques Delors (1998) in the UNESCO-Report “Learning: The treasure within”, learning is based on the aspects learning to know, learning to do, learning to live together, learning to be, as the four pillars in education for the 21st century.

Competencies are described as learnable but not teachable. This leads to the increasing relevance of the question of whether and how they may be acquired via learning programs (Weiner 2001, p.52f). There is a distinct connection between competency concepts, educational framework conditions, training of teachers and shaping of learning processes.

Competence-oriented educational concepts focus on output of the aspired educational processes whereas conventional syllabuses and didactic approaches focused on input, which meant contents and subjects, which pupils should study. The output approach on the other hand asks not what should be taught, but what should be learned, what abilities for acting, which concepts and problem-solving strategies people should have acquired as a result of the learning process. The acquisition of competences is hardly comparable with learning as knowledge acquisition. Therefore it helps to focus on action competence and prevent the mere accumulation of “inert knowledge” (Weinert).

McKeown (2002) differentiates in her ESD toolkit between „knowledge, skills, perspectives, values, and issues“. According to her, these components are to be taken into consideration when restating curricula in the sense of ESD.

As a basis for the competence model of CSCT we take the extended definition of Franz E. Weinert, as is has been adopted by the DeSeCo Project (Weinert 2001, p. 27f, and Rychen & Salganik 2003, p.41f, Klieme et al 2003, p. 21f). We especially esteemed the connection of a demand oriented or functional approach with the internal structure of a competence, but also, that competences are context dependent.

„The theoretical construct of action competence comprehensively combines those intellectual abilities, content-specific knowledge, cognitive skills, domain-specific strategies, routines and subroutines, motivational tendencies, volitional control systems, personal value orientations, and social behaviours into a complex system“ (Weinert 2001, S 51).

Competencies don't exist per se but always relate to a certain desired output. One can focus on the functional approach when defining competencies: the result an individual achieves through an action, a choice or a way of behaving, in connection with the demands of the particular profession, social role or personal project (e.g. the ability to cooperate). This demand-oriented approach has to be combined with and complemented by the definition of the internal structure of a competence, as “internal mental structures in the sense of abilities, dispositions, or resources embedded in the individual” (Rychen & Salganik 2003, p.44). This would include all knowledge, cognitive skills, practical skills, attitudes, emotions, values and ethics, and motivation, which is related for instance to the ability of cooperation. “Without research on internal structures, no barriers can be provided against the temptations an traps of mere ‘ability-to’ expressions” argue Witt and Lehmann (2001, p.5). The identification of the internal structure of a competence can help to define the prerequisites for the gaining the competence, to create tasks and manuals for learning the competence, and identify necessary learning conditions.

In addition it is important to take into consideration the context dependency of a competence. Individuals do not act in a social vacuum, Action always takes place in specific and various social and socio-cultural fields. In the holistic and dynamic model of competence underlying the DeSeCo project competencies are not regarded as existing

independently of action and context. Instead, “they are conceptualised in relation to demands and actualised by actions (which implies intentions, reasons, and goals) taken by individuals in a particular situation” (Rychen & Salganik 2003, p.47).

For the formulation of competencies in relation with ESD we have to be attentive not to focus only on personal abilities and motivations, but also on surrounding frame conditions. Supporting structures have to be created in which the competencies can be used.

Since competencies are very complex and manifest themselves only in actions and behaviour in certain contexts, the application of competencies can only be observed and measured indirectly. Also, we must consider that a single competency may be realised differently due to different support and thus inside another environment. Implications for the measurement of competencies therefore are, that we must draw conclusions about the underlying competencies and the connected attributes indirectly. Moreover, since competencies are supposed to prove themselves in a context-overlapping manner, they cannot be measured by single, isolated performances. Evidence of competence can only be gathered by observation in varied situations. (Rychen & Salganik 2003, p.48).

For ESD another facet of the notion of competence is crucial. ESD is a common social project. No single person can have all needed competences alone. The conception of collective competencies serves the demands of ESD far better. According to the “strength model” (McKeown 2002) the different and various competencies and strengths of individuals and disciplines should contribute to ESD and the UNESCO named “partnership and networks” as one of the seven strategies of the DESD. Division of labour, distribution of resources and to take into account the dialectical relationship between the competencies of individuals and the structural and institutional characteristics of the context can meet the complex requirements of Sustainable Development and of ESD.

The five domains of competencies of the CSCT-Model

Planning the teaching, reflecting the educational work, visioning the profile and performance of your school, looking for partners outside the school – it all needs a set of basic angles to consider for fostering a successful education for sustainable development. For each of these perspectives it needs a set of competences, which are crucial for effectively managing the process.

We identified five competence- domains, of which each must have a specific profile for ESD. Even though these domains may appear as separate elements in the graph, they interact intensively and are in reality inseparable. Therefore overlapping was inevitable. By decision we allocated the different competences to only one of the domains.

Our model of competences is based on a theoretical background as well as on experiences of all participants of the project. Actually there are very few sources listing competences

for teachers specifically. Exceptions are ENSI SEED QC, WWF Pathway.... Various sources in the literature dealing with ESD suggest the categories “Knowledge - Issues - Skills - Perspectives - Values” or similar (UNESCO Implementation Scheme, ESD toolkit, UNECE) which is another system of categories than our five domains.

The following short description introduces the reader to the five domains.

Knowledge

As specific features of knowledge for ESD we defined: conceptual, factual and action related knowledge. Knowledge has to relate to time (past - present - future) as well as to space (local - global) and it is inter-, trans-, pluri- or cross-disciplinary constructed. Knowledge is constructed by each individual and has developed with all the experiences in each life and thus you also have to take into account the social structure of knowledge. The viability of our knowledge determines its quality. Today viability should be linked to responsibility for the nature will not be exploited any more (see ethics and values). Critical thinking is indispensable.

Systems thinking

The complexity and interconnectedness of today’s world asks for thinking in systems. There is an increasingly shared view, that analytical thinking and reductionist thinking are not sufficient to envision a sustainable future or to solve the current problems. Different kinds of systems are addressed: biological, geographical, ecological, political, economical, social, psychological ... including interrelationships in time and space. It implies the awareness of being part of the living system “earth” in space and time.

Emotions

Thinking, reflecting, valuing, taking decisions and acting are inseparably tied with emotions. Emotional competence is therefore indispensable for ESD-commitment and processes. Empathy and compassion play thereby a key role.

Feeling inter-connectedness with the world is basic for intrinsic motivation in ESD.

Ethics and Values

Norms, values, attitudes, beliefs and assumptions are guiding our perception, our thinking, our decisions and actions. They also influence our feelings. The main guiding principle of ESD is equity (social, intergenerational, gender, communities ...). Equality between man and nature is explicitly included only in some SD-concepts. The „Earthcharter“ (www.earthcharter.org), officially recommended for ESD by the UNESCO is an exceptional

example for a declaration of fundamental ethical principles for building a just, sustainable, and peaceful global society for the 21st century.

Action

Action is the process, where all the competences of the other four domains merge to meaningful creations, participation and networking in SD. It needs additional special practical skills, abilities and competences in the field of project management and cooperation.

All four levels of action have to be considered for a successful ESD: individual, classroom/school, regional and global. Actions allow to experience conflicting interests, change, to be involved (participation), learning from mistakes, synergies and success. All of them can increase motivation for further learning and continuing action if they are chosen wisely. Actions allow applying the solidarity developed through empathy and compassion.

For each of these five domains we developed competences on three different levels:

- The teacher as an individual - connected with reflection and visioning
- The teacher in the educational institution - connected with teaching and communication
- The teacher in the society - connected with cooperation and networking

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Competences related to Knowledge

Definition of knowledge

The following types of knowledge applied by teachers are today widely recognized amongst educational researchers (Shulman, 1986, 1992; Cochran, 1997) and are used here as a framework to classify the different competences regarding the knowledge dimension of the CSCT conceptual framework:

- Content knowledge (CK), which encompasses the theories, principles and concepts of a particular discipline (Shulman, 1986). Applied to SD, this category refers to knowledge about issues such as climate change, poverty distribution, desertification ..., but also understanding of inter- and intra-generational solidarity, the principle of precaution etc.
- Pedagogical knowledge (PK) which refers to the general knowledge teachers have about instructional methods.
- Pedagogical content knowledge (PCK), the type of knowledge which is unique to teachers and which is based on the manner in which teachers relate their pedagogical knowledge to their subject matter knowledge. This type of knowledge refers to the manner teachers transform and represent subject concepts and ideas in such a way that they make sense to their pupils or students. Several studies show that most novice teachers struggle with this type of knowledge (Cochran, 1997).

As pedagogical knowledge refers to general knowledge about instructional methods etc., which do not refer specifically to ESD, we do not deal with this type of knowledge in this project. Of course, it does not mean that pedagogical knowledge is not important for teaching SD issues; but we think that the reader can find sufficient information about it in specialized articles and books.

Theoretical background

Knowledge building

Knowledge building is considered from a constructivist perspective. This means that aspects of information processing are combined with motivational issues such as volition and self-directed learning (Phye, 1997), which is also expressed in the CSCT conceptual framework. However, as especially for ESD motivational issues are considered of extreme importance for the construction of personal knowledge, they were included in the framework as separate dimensions and therefore, they are not included in this chapter.

Knowledge dimensions

If the main goal of ESD is the development of teachers' students' and their pupils' competences which enable them to find possible pathways for solutions for SD challenges, then it follows automatically that the knowledge they need is action-oriented and that it will involve an interdisciplinary connection between environment, people, culture and society (Jensen & Schnack, 1997; Jensen, 2002). Jensen & Schnack (1997) distinguish 4 dimensions of knowledge people need when they are motivated to find solutions for environmental problems; we translate them here for SD problems:

- Knowledge about the existence and spread of sustainability issues, such as the relation between CO₂ and global warming, the occurrence of poverty and its causes etc. This knowledge is essential in order to stimulate interest and to rouse concern, creating the starting point for a willingness to act. But the same authors warn, that this knowledge may have an adverse effect if it is learned in isolation, as it may create a growing concern amongst students that the issues are too complex and too large and this will lead to 'action paralysis'.
- The second aspect deals with knowledge about the causal dimension of SD problems, knowledge which mainly belongs in the sociological, cultural and economic spheres. This includes knowledge of social organization, of economic organizations such as IMF, Worldbank, ... and the role they play in SD issues.
- The third dimension deals with knowledge about indirect and direct possibilities for action; according to Jensen and Schnack, this knowledge dimension is central to an action-oriented form of ESD and usually belongs in psychological, political and sociological spheres.
- The fourth dimension deals with the necessity of developing one's own vision on SD and ESD.

Position within the CSCT concept

Teacher training today is still strongly influenced by the so-called technocratic model, which can be roughly summarized as follows:

- Knowledge is considered by both the teacher and the learner as unproblematic.
- Emphasis in teacher training is on technical expertise and mastering of domain knowledge.
- Curriculum is build around a set of practices which result in measurable learning effects.
- The competences and skills are not connected to the ethical and social context.

The emancipatory model considers teachers as individuals who are able to deal critically with the present reality and have the desire to improve this reality.

In this model, the teacher has the role of an intellectual who can contribute to active citizenship and to the development of a democratic society. According to critical pedagogues such as Giroux and McLaren, education should take a critical position towards the dominant powers in the society. As a consequence teachers should be equipped with competences which allow them to deal with the tension between the existing and the desirable reality.

Almost by definition, teaching for SD can only be approached according to the emancipatory model.

The competences of a teacher are strongly influenced by the beliefs and values he or she has. SD issues are nearly always controversial and involve value judgments which cannot be settled by (scientific) evidence alone (Summers e.a., 2005). For example, a teacher who is convinced that global climate change is a natural phenomenon which is not influenced by human activities will probably not encourage her/his students or pupils to participate in local Agenda 21 or other activities that focus on reducing CO₂ emission. Or a teacher who believes that SD challenges can only be resolved on a high policy-making level, and therefore believes that citizens have no role to play in SD debates, will probably not stimulate his/her students or his pupils to take actions for SD.

Of course, teachers' values and beliefs are strongly reflected in their personalities and identities. Tickle (1999) states that the 'teacher as a person is the core by which education itself takes place'.

It is also the case that controversial SD issues generally provoke strong emotional reactions: we can think of the heated discussions between nature conservationists and project developers, between proponents and opponents of globalization etc. It is inevitable that many students will also have strong views on such issues, and teachers should help their pupils or students to deal with these concerns and emotions (Sterling, 2001).

The examples above demonstrate the link between knowledge and action. By action new knowledge is built but in order to act people call on knowledge.

Sustainable development issues are complex as they require not only good general problem solving skills, but also high levels of expertise in a broad range of knowledge domains. In addition, finding ways to possible solutions also requires from the problem solver the competence to identify and to connect the ecological, economic and social dimensions of the problem. This aspect relates knowledge to systems thinking, which is often reflected in attempts at interdisciplinary teaching and learning.

Specific aspects of content knowledge for SD relate to issues such as uncertainty, complexity, risk, society, system thinking and to the interconnectedness between social, economic and ecological dimensions. Furthermore, knowledge should be action-oriented

(should contribute to the action competence of students) and value based. It should take into account the spatial (local/global) and time (past, present and future) dimensions.

Definition of the sub-competences

Teachers have responsibilities with respect to their pupils or students, towards the school and educational community and towards society.

For each of these responsibility levels, competences and sub-competences were formulated with respect to content knowledge and pedagogical content knowledge:

Teacher as a guide of learning processes

- The teacher is able to acquire relevant and embodied knowledge about SD challenges and issues.
 - The teacher knows the concepts of SD and ESD and the most relevant national and international policy documents relating to SD and ESD.
 - The teacher has mastered SD key concepts and knowledge (cf. table 1).
 - The teacher is able to value knowledge as the result of cultural heritage and is able to critically reflect on it.
 - The teacher is able to help students to distinguish between factual knowledge and opinions.
- The teacher is able to select educational goals for SD, taking into account the developmental stage and the prior knowledge of the pupils or students, and the diversity within the group of learners.
 - The teacher is able to identify locally and globally relevant SD issues and to connect the local and global aspects of the issue involved.
- The teacher is able to create a powerful learning environment for teaching SD issues.

The teacher as a member of the school and the educational community

- The teacher acquires sufficient knowledge of relevant SD issues in order to contribute to the construction of a curriculum that integrates SD into the whole school curriculum.

The teacher as a member of the society

- The teacher is able to find partners outside the school community and to co-operate with organizations which promote sustainable development.

Table 1. Key concepts with respect to ESD (Huckle, 2005)

- Interdependence of society, economy and the natural environment, from local to global (chain reactions, multiple causes and multiple effects, trade offs).
- Citizenship and stewardship (rights and responsibilities, participation and co-operation).
- Needs and rights of future generations.
- Diversity (biological, social, economic and cultural).
- Quality of life, equity and justice.
- Development and carrying capacity.
- Uncertainty and precaution in action.

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Teacher Competences related to Values and Ethics

Definition and basic terms

Values

Values are certain beliefs, attitudes or convictions that are reflected in our personal behaviour. They are influenced by a variety of factors such as ideology, religion, gender, class and culture, personal experiences of life or reason, all of which help to form our perceptions of the world.

Values are an orientation towards all major areas of human concern, from religion to politics to economic and social life. They are the centre of who you are and what you are, they define you as a person.

Values have three important characteristics:

- 1) Values are developed early in life and are very resistant to change.
- 2) Values define what is right and what is wrong (intrinsic).
- 3) Values themselves cannot be proved correct or incorrect, valid or invalid, right or wrong. If a statement can be proven true or false, then it cannot be a value.

Hans Ruh (2006), professor for social ethics, lists the following basic values of a European ethic: justice, life, human dignity, dignity of creation, freedom, sustainability, trust, forgiveness, peace and meaning.

While the internalised values of individuals are important, the organization has a major impact on the behaviour of its members, and can have a positive or negative influence on their values.

So how do *values* relate to *ethics*, and what do we mean by ethics?

Values are what we, as a profession, judge to be right." Individually or organizationally, values determine what is right and what is wrong, and doing what is right or wrong is what we mean by ethics. To behave ethically is to behave in a manner consistent with what is right or moral. What does "generally considered to be right" mean? That is a critical question, and part of the difficulty in deciding whether or not behaviour is ethical is in determining what is right or wrong.

Ethics

In ESD we focus on normative aspects, on how we act in the world, on how we behave towards the world and others and what moral values underlie our behaviour. This includes areas such as philosophy, law, economics, and social and political theory.

A vision of fundamental ethical principles for building a just, sustainable, and peaceful global society for the 21st century is listed in the Earth Charter (www.earthcharter.org). This document was created as an ethic framework for Agenda 21 by the largest global consultation process ever associated with an international declaration. The charter is officially recommended for ESD by UNESCO. It is translated in 30 languages and offers various teaching materials.

Another helpful document supporting a world-ethos for a peaceful and just future, is the “Explanation to the World Ethos” by Küng and Kuschel (1993), published by the parliament of the world religions.

Norms

The standards we have in relation to the broad range of issues we face in society which then influence how we act in various areas - social, political, economic, religious etc. Moral judgements that define wrong and right behaviour, the allowed and the disallowed, what is wanted and not wanted within a culture.

Hans Ruh defines basic norms of a European ethic as follows:

Reverence for life, reverence for all things developed in a long time, avoidance of suffering and damage, protection of basic life resources, responsibility for general welfare, treating similar things in a similar way, fair trade, balancing inequities that are not ones own fault, willingness to perform, help in cases of misery, solidarity, participation.

Morals

Morals have a greater social element to values and tend to have a very broad acceptance. Morals are far more about good and bad than other values. We thus judge others more strongly on morals than values. A person can be described as immoral, yet there is no word for them not following values.

Beliefs

Beliefs are convictions about what we are doing, what is of worth, why we are doing it, and what the effect will be.

Attitudes

Attitudes refer to a complex mental state involving beliefs and feelings and values and dispositions to act in certain ways (e. g. "he had the attitude that work was fun").

Assumptions

Assumptions or suppositions are subjective perspectives/theories which can be obstacles for new learning experiences.

Position within the CSCT framework

Values and emotions are closely related to each other: emotions always have a valuing character and values or valuing is always also emotional. In most definitions of "values" emotions play a subsidiary role. Most theories are dealing with the structure of the values-system and not with the interrelationship between values, emotions and regulation of acting. There is a need for further research in this field. (Schmitz, 2000).

The importance of values are defined as crucial in various educational contexts, especially in connection with ESD:

"ESD is fundamentally about values, with respect at the centre: respect for others, including those of present and future generations, for difference and diversity, for the environment, for the resources of the planet we inhabit. Education enables us to understand ourselves and others and our links with the wider natural and social environment, and this understanding serves as a durable basis for building respect."

(United Nations 2004, p. 4.)

"The school curriculum should pass on enduring values ... and help [learners] to be responsible and caring citizens capable of contributing to a just society. It should develop their awareness and understanding of, and respect for, the environments in which they live, and secure their commitment to sustainable development at a personal, local, national and global level "

(Scott 2002)

A teacher-training institute engaged in ESD therefore has to enclose in the curriculum activities of clarifying and negotiating values and in constructing new ones.

The Shell-Youth-study (1997) proved that not the idols and values have been disappeared among youth, but the hope, that they will be fulfilled. The main task of schools is not primarily to raise the hope again but explain the function of values and idols: to think

critically about reality (von Hentig, 1999). Values therefore are an important part of the construction of critical thinking.

ESD is explicitly founded on values and rationality. They have a major impact on the way we act. If we share the value of having respect for the diversity of human beings, we must practise this value accepting the existence of other values. Values cannot be easily changed. One of the challenges of working with student values is on one hand to clarify and make explicit personal values while on the other hand giving the space for other beliefs. We think that teachers should, whilst participating in a process of clarification, also have to investigate their own beliefs and assumptions. Uncertainties and tensions are elements of ESD and should not paralyse education but support it.

Ethics can be introduced in a rather pragmatic way starting at the age of 10 by using examples of the everyday life. Only after puberty it is possible to make it a subject of systematic exploration (von Hentig, 1999).

Four conditions have to be fulfilled so that working with these topics is effective: the issues have to be meaningful to teacher and students; nothing which should remain comes fast; all learning has to be combined with experience; the person of the teacher has to be involved - he/she is the strongest instrument (von Hentig, 1999).

Competences

1) Teacher as an individual

- The teacher should be able to clarify (making implicit beliefs explicit) his/her own beliefs, assumptions and values related to Sustainable Development, Education and learning.
- The teacher should be able to encourage students to question their beliefs and assumptions in order to clarify their thinking.
- The teacher has to be aware of societal tensions including conflicting interests and also the positive trends in the society related to SD and education, so that they can anticipate changes and the consequences of action.
- The teacher has to be able to analyse the underlying structure and the reasoning which supports this, thus allowing both themselves and the students to participate in the decision making processes of the society they inhabit.

2) Teacher in the educational institution

- The teacher is able not to impose his/her own values and opinions allowing students to hold their own positions.
- The teacher is able to modelling values of respect and dignity which underpin sustainable development, in personal and institutional life.
- The teacher is able to helping learners gain plural perspectives on issues.

- The teacher is able to making the assumed norms explicit so that they can be examined, debated, tested and applied.
- The teacher is able to helping learners develop critical understandings of sustainable development.
- The teacher is able to focusing on students clarification and discussion of their own values.
- The teacher is able to offering students opportunities to appreciate and confront diversities and to look at them as opportunities.
- The teacher is able to working with contradictory beliefs, assumptions and values as well as moral dilemmas.
- The teacher is able to offering opportunities to students to distinguish between factual knowledge and value-based opinions and to investigate the beliefs and interests behind them.
- The teacher has knowledge about a range of teaching/instructional methods/materials related to values (what, how, when) i.e.:
 - research based learning.
 - real life learning.
 - project learning.
 - role play games.
 - discussion forums.

3) Teacher in the Society

- By focussing on students' clarification and discussion of their own values the teacher is able to ameliorate mutual respect and understanding.
- Teachers need to be aware that values can not simply be applied but are developed through an ongoing and context-sensitive process.
- Teachers should be able to focus on understanding the concept of European citizenship, including the rights and responsibilities it confers.
- The teacher is able to cooperate to bring about structural or institutional change within society so that efforts can be embedded within the mainstream. ESD must go beyond individual self-development to promote structural social change.
- The teacher is able to use existing regional, national and international policy framework, non-governmental organisations and networks for ESD to build common understandings, to identify common challenges and to strengthen common commitment in order to plan joint actions.

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Systems thinking

Definition and basic terms

Complexity is increasing in today's world and a policy for sustainable development needs strong solutions to cope with this fact. Our dilemma in dealing with this complexity emerges when we define simple cause-effect relationships and draw simple and logical conclusions, which only exist in theory. In reality a fundamental change in seeing and perceiving the world is necessary in order to solve the current complex tasks and problems and to prevent future ones: We need a systemic way of thinking, reflecting, visioning and acting. Systems thinking investigates patterns, connections and relationships between elements (Vester 2004). This way of thinking is crucial with regard to the importance of retinity, participation and anticipation in sustainable development.

The main characteristics of systems thinking were developed simultaneously in different disciplines during the last century. Biology and especially ecology had pioneering tasks but also in disciplines as diverse as psychology, philosophy, quantum physics, organic biology, cybernetics this kind of thinking was developing. Fields of application reach from control engineering to communication theory from sociology to economy and schools.

Systems thinking emphasizes patterns and relationships rather than isolated elements or parts. In consequence each individual is always connected in various ways to its environment - is always a part of it.

Some relations of systems thinking to ESD

The awareness, that human beings are part of the infinite "sub-systems" of our Earth, part of "the global system as a whole" and dependent on it in so many ways, is central to ESD. This awareness needs to encompass ecology, economy and society.

Anticipation: Through looking and thinking ahead of present time or looking at the present time from the perspective of the future, it is possible to create visions which are a specific element in ESD. In this regard it is also important to look at evolution, at our history, to look back where we are coming from and to imagine where we want to go.

Creativity: It is necessary to invent new solutions to problems, with new ways to cooperate with our Earth's systems. Through the efficient flow of information, sophisticated communication and a careful way of handling information in a (e.g. social) system, its creativity is enhanced and new properties can emerge.

Definition of systems thinking

„Systems thinking is about gaining insights into the whole by understanding the linkages and interactions between the elements that comprise the whole ‘system’. Consistent with systems philosophy, systems thinking recognizes that all human activity systems are open systems; therefore, they are affected by the environment in which they exist. Systems thinking leads to recognition that, in complex systems, events are separated by distance and time; therefore, small catalytic events can cause large changes in the system. Systems thinking acknowledges that a change in one area of a system can adversely affect another area of the system; thus, it promotes organizational communication at all levels ...“This Wikipedia-definition seemed to us very helpful introduction.

‘Systems thinking’ is often used as a synonym for networked thinking, holistic thinking, cybernetic thinking or complex problem solving.

For a more detailed definition we refer in the following to expert statements.

First some key terms for living systems are explained:

- Wholeness: the whole is more than the sum of the elements and has a different quality than the elements themselves.
- Holon: each system is whole (a holon) but simultaneously part of a bigger system (Koestler, 1984). Everything is linked to everything.
- Open systems: they have a constant flow of energy, matter and/or information and therefore are able to maintain a balance (feedback loops and interdependency).
- Homeostasis: ability of self regulation to maintain a dynamic equilibrium.
- Autopoiesis: ability for self-organization, spontaneous appearance of new structures and behaviours in open systems.

Four basic criteria of systems thinking make it to a paradigmatic change in thinking and understanding of our world (Capra 1998 p. 246, English version 1992):

- From the elements to the whole, that means to the patterns of organisation.
- From single elements to relationships.
- From structures to processes.
- From objectivity to construction of reality by each individual

The four basic dimensions of system thinking according to Ossimitz (2000) are:

- Relational thinking: Thinking in feedback loops and relationships considering indirect effects (including thinking from different perspectives).
- Dynamic thinking: Thinking along the timeline, taking in account time delay.
- Thinking in models: modelling and networks of effects.
- Goal: Acting in a systemic way.

Position within the framework of domains

Systems thinking contributes in many ways to help us to understand and act in a sustainable way in a local as well as a global context. Systems thinking is a tool, which links *knowledge* to a larger context and helps us to see it in a dynamic way. As a tool for weighing, making *decisions* and taking *action*, however, it is only useful when it is linked to *values and ethics*. Otherwise it could also be misused in non-sustainable ways.

Systems thinking asks for changing perspectives and the ability to look through other's eyes, that can help to build up empathy and therefore is also linked to the domain of the *emotions*. By means of a systemic view of the world, a feeling of being part of a larger system can evolve.

It expands our world-view and helps to be more aware of the boundaries and assumptions we use to define issues. It integrates decision-making and adaptive management, and encourages consideration of multiple influences and relationships and fosters therefore more participative and interdisciplinary approaches to problem solving. It helps to restore a sense of connection to place, to other humans, to nature and the wider world through realizing the fact that everything is somehow linked to everything else. It also recognises the influences of our *values*, self-perception and interpretations of the world, as well as our intuitional and non-rational ways of knowing. In this regard it also helps us to appreciate others' viewpoints and to discover new properties of whole systems that emerge from the interaction of individual parts.

Today a variety of *methods* is already available for teaching and facilitating these higher-order thinking skills like simulation games, computer simulations, drawing impact-diagrams, mind maps, concept maps etc.

This dynamic way of looking at the world supports us in accepting uncertainty and ambiguity, and in *participating* and learning from change. It is a tool to identify strategies that better generate sustainable solutions for system change, emphasising self-organisation and resilience.

Systems thinking is related to ambiguity and uncertainty - we all have to learn to endure this but at the same time to trust decisions and action even if we cannot see the success or effect right away. Again we find here a link to the *emotions domain*.

Systems thinking asks for a specific way of *action*, which allows self organization and participation and investigates power relationships.

Systems thinking and *constructivism* are closely related to each other. Constructivism is a field of applying systems thinking. For this reason systems thinking can help to plan, organize and reflect learning and teaching activities.

We did not find any specific competences on systems thinking formulated explicitly for teachers in the literature. The majority of the competences listed were developed by the group members, some refer to the work of Daniella Tilbury or the Quality criteria of ESD-schools (chapter on culture and complexity). We also referred to the “Habits of a Systems Thinker” of the Project “Systems Thinking in Schools” (see Literature/Media).

a) Teacher as an individual – reflection

- The teacher is able to understand basic models of systems theory (e. g. Vester) and is able to apply them in different situations and for different issues.
- The teacher is able to think in models and patterns, to recognize patterns and relationships in systems, to reflect on them and to consider them in decision making and acting. It all requires well developed imagination-skills.
- He/she is aware that he/she is always part of different systems and realizes, what function he/she has and what role she/he plays in these systems in the society (i.e. understands its structures, culture, practices, and formal and informal rules and expectations and the roles they play within it, including understanding laws and regulations, but also unwritten social norms, moral codes, manners and protocol).
- The teacher is able to resist to the tendency to simplify problems and to look for quick solutions – she/he holds the tension of paradox and controversy and looks at the larger context.

b) Teacher in the educational institution – teaching/communication

- The teacher’s pedagogical work in every subject, is based on searching for relationships, multiple influences and interactions such as feedback loops or dynamics over time and finding ways of explaining them or making them visible (ENSI, 2005, Quality Criteria for ESD-schools).
- The teacher is able to encourage the students to look at issues from different perspectives (angles and dimensions) as well as their short- and long-term consequences.
- The teacher is able to guide students to develop empathy by identifying themselves with others. This implies the appreciation of each other’s viewpoints which helps to facilitate understanding and the development of solidarity as opposed to a tendency to enhance disagreement.
- The teacher is able to support students in confronting and appreciating diversities - biological, social, cultural - and to look at them as ‘opportunities’ for broadening options for change and development (ENSI, 2005, Quality Criteria for ESD-schools).
- The teacher is able to foster the student’s insight so that, besides exploring issues and interests, they can utilise reason to propose innovative solutions that develop in and through the relationships between them.

- The teacher is able to guide the students to deal with power relations and conflicting interest e.g. in school, in local situations, between countries and between present and future generations.
- The teacher is able to help students to take action by choosing between different options and by reflecting on their own potential (strengths, specialities etc.) as well as short and long term consequences in relation to individual and shared interests, norms and goals. She/he encourages them to monitor the results by presenting different methods.
- The teacher is able to enable students to face ambiguity, uncertainty and complexity - and not to be fazed by it. She/He encourages the students to reflect on themselves and their environment, to look for different solutions, to take decisions to elaborate plans and to realize actions even if the success or effect is not visible right away. He/she helps to build up their faith in a common process in which everyone is an element.
- The teacher helps to restore a sense of connection to place, to others and the wider world (Tilbury & Wortman, 2004).
- The teacher is able to perceive the school as a living system and tries to act with the school team and in class according the insights of systems thinking in the context of ESD (e. g. fostering participation, participatory learning, mutual understanding).

c) Teacher in the Society – networking

- The teacher is able to use wisely existing local, national or international networks for ESD to gain motivation and exchange experiences and perspectives.
- The teacher knows ways to establish partnerships with other schools to generate and exchange ideas and is able to do the same with business, craft, industry, agriculture, community etc. thus enabling a search for synergies.
- The teacher is aware that schools are a part of local, national and global systems.
- The teacher is able to identify and analyse power relationships in society (e. g. community) and to understand their causes/origins (interests, motivations etc.) as well as strategies to cope with them.
- The teacher is aware, that systems thinking is not yet generally understood in society and looks for ways of communicating systems thinking through student works (events, exhibition, presentation, performance, videos, ... for parents, the neighbourhood and the wider communities).

Remark:

Competences for ESD which relate to systems thinking by De Haan:

- Competence in foresighted thinking.
- Competence in distanced reflection on individual and cultural models.

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Competences related to Emotion

Definition and basic terms

Introduction

Emotions for a long time were taboo in science, economy and society (Arnold 2005). Emotional influences on thinking and behaviour were mainly looked upon as a disturbing factor; they were seen as the antithesis of reason. It is only recently that in several scientific areas it has been slowly accepted that affective components are inseparably connected to thinking and that they have important organizing and integrating functions (Ciompi, 1999).

It is therefore not surprising, that in most traditional explanatory concepts for environmental behaviour the influences of emotions have been neglected.

At the end of the 80s emotional aspects were considered important for environmental consciousness in those concepts with a holistic approach. But emotions and feelings were rarely the subject of scientific research or in-depth descriptions in this field. Even models on environmental psychology mostly neglected this aspect (Kals et al. 2000).

From the beginning of the project we selected a set of definitions for emotions and feelings that we found suitable, and then added basic descriptions of emotional competences.

Emotions and feelings

There is not one generally accepted theory of emotions and the terms in various language regions vary.

We suggest using the definition based on the theories of Antonio Damasio (2005): Emotions and feelings are both affective phenomena. The emotion experienced is the beginning of a reaction chain, which ends in a feeling. Emotions are acts or motions mostly visible to others (e. g. in one's face, voice, behaviour) as feelings are only recognizable by the person in whose brain they are evolving.

The term "emotion" is often used as a generic term for emotions, feelings, sentiments.

Emotional competence (emotional intelligence)

The concept of emotional competence assumes that the emotions are a central part of what it is to be human. Generally the following three aspects are included (Arnold 2004):

- Understanding one's own emotions and feelings.
- Understanding the emotions and feelings of others.
- Ability of emotional expression, i.e. the ability to express feelings in a meaningful way.

Salovey and Mayer (in J.H. Otto, 2000) include in their list of emotional intelligence in addition to the list above:

- Regulation of emotions.
- Productive use of emotions (e. g. for planning, thinking, problem solving, motivation).

Empathy

Definition: More than feeling compassion or sympathy “for” another person, empathy puts you in their shoes to feel “with” them or “as one” with them. First used in English in the early twentieth century to translate the German psychoanalytic term “Einfühlung”, meaning “to feel as one with”, though in practice more closely translating the German Mitgefühl, “to feel with” someone (www.jansen.com.au/Dictionary_DF.html).

Empathy was generally used in connection with other human beings and not with nature. Today this is changing as the environmental movement grows in strength and concepts such as Gaia become more prominent. We, therefore, assume that empathy can also include non-human beings - indeed the whole of nature. Gebhard mentions that concern about nature is often articulated through identification with nature-phenomena (Gebhard 2001, p. 270). De Haan includes empathy as one of the “Gestaltungskompetenzen” for ESD as well. Empathie und Solidarität für Benachteiligte, Arme, Schwache und Unterdrückte zeigen können.“ (www.transfer-21.de)

Emotional attachment, interconnectedness

Emotional attachment is the precondition, that humans are shocked by changes in their environment. Humans without emotional attachment remain indifferent towards everything that happens around them. E.g. If a human being has not had the chance to develop an emotional attachment to nature he or she will not be able to take on responsibility (cf. Hüther 2005, p. 220).

Therefore one goal of education for sustainable development must be to give students opportunities to develop a deep relationship and feeling of interconnectedness to our world, to life and be supported in this process.

If a person cannot feel awe and wonder, cannot experience delight in the world around them, in literature, music, art and nature itself, then they will live in an inner spiritual and cultural desert. If someone cannot connect to the world around them, then they cannot see the connections in that world and will fail to understand it and the humans and others who inhabit it.

This interconnectedness includes elements of spiritual development, which is rarely described in school curricula. One exception is a document for schools in England and Wales (from which the previous paragraph is taken) which includes the following elements: beliefs (development of personal beliefs in connection with personal identity), a sense of awe, wonder and mystery, experiencing feelings of transcendence, search for meaning and purpose, self-knowledge (thoughts, feelings, emotions ...) , relationships (sense of community) creativity (e. g. expressing feelings through arts) feelings and emotions (sense of being moved, hurt ...). "This kind of spirituality is open to everyone and is not confined to the development of religious beliefs or conversion to a particular faith."(School Curriculum and Assessment Authority, 1995, p.3/4).

Position within the framework of domains

Thinking, reflecting, valuing, taking decisions and acting are inseparably tied to emotions. Emotions are an essential part of the decision making process (Cornelius, 1996) and also the driving force and primary system for motivation (Arnold 2004, Otto 2000), which has to be taken into account in ESD.

The importance of emotions for environmental behaviour was described by Elisabeth Kals in a model explaining the protective behaviour of the commons. She found different emotional judgements supporting this behaviour: nature related emotional judgements (e. g. deep relationship to nature) are very influential, responsibility related emotional judgements (e. g. feelings of guilt about not enough for the environment, anger about insufficient environmental protection) and positive feelings while acting for the environment (provided that ecological norms are accepted) also have a substantial impact, while the emotional reaction to an awareness of environmental danger has a less positive influence (Kals in Reichle & Schmitt 1998). Armin Lude (in Unterbruner 2005) confirms also the positive impact of varied nature experiences (which always have an emotional component) on positive attitudes to nature and on acting protectively for nature and environment, especially when the experience is reflected upon. Degenhardt (Degenhardt in Bolscho & Michelsen 2002) searched, by in depth interviews with a variety of people

leading a fairly sustainable lifestyle, for necessary competences. He decided that the most important of the eight competences he listed was “Competence of holistic perception”: When viewing the world, the combination of different forms of emotional and intuitive perception utilising all the senses combined with a rational analysis, is crucial. The affective and emotional process is, in fact, a necessary condition of perception. Gerald Hüther goes one step further and claims that people without emotional attachment remain indifferent to what is occurring around them, when they are not directly affected. Without activation of emotional centres it is not possible to anchor new experiences in the brain (Hüther in Gebauer & Gebhard 2005). Szagun e.a. (1994) emphasise, that emotions attached to a pessimistic view of the future show even more effect on environmentally sound behaviour than joy about nature. All of these findings demonstrate, that an emotional commitment is needed (Anteilnahme), in order for knowledge to be transferred into action. (Unterbruner in Kaufmann-Hayoz & Künzli 1999, p. 165).

The challenge for education for sustainable development is to carefully include emotional processes as part of teaching and to integrate emotional competences into the process. As Szagun emphasises, dealing with negative feelings as well as empathy and compassion play a key role. In addition, feeling inter-connectedness with the world is a basic condition of any intrinsic motivation for acting in a sustainable way.

Teacher competences related to emotions

Given that the list of competences is daunting, should the following sentence go in as a warning:

‘Because of all these issues the task required of teachers is a major one, as the following list of competences demonstrates.’

a) Teacher as an individual – reflection

- Teachers have to be able to use ways and methods to express and manage their emotions and feelings alone and in groups (e. g. conflict management) and use them constructively for improving situations in the school and community (cultural, ecological, social, economic).
- Teachers have to be aware that emotions are crucial to our lives and can often be related to former experiences and also depend on the surrounding culture. Teachers have to be aware of the impact of emotions on perception, judgement, decisions and acting in their own lives and the lives of their students and to take account of this in the way they teach.
- Teachers develop in themselves the competences of compassion and empathy and develop the awareness of interconnectedness with the world/life in space and time.
- Teachers are aware of the emotional dangers of domination (e. g. power relations).

b) Teacher in the educational institution – teaching/communication

- Teachers have motivation and the skills for advocacy both in the school team and for lobbying outside the school for ESD.
- Teachers should be aware of the difference between dealing with emotions within their own class or school organization and with the surrounding society.
- Teachers are able to create a school atmosphere in a way that allows every one to express his/her feelings and to contribute with innovative ideas and proposals without fear of failure. This is a precondition for creativity and visioning.
- Teachers create learning situations and an appropriate atmosphere so that their students are able to develop feelings of empathy and identification with other human beings as well as with nature as a whole in both space and time, and develop a sense of solidarity with all that exists.
- Teachers know how to stimulate ownership and responsibility.
- Teachers help students to develop emotional competence (besides other competences) to consciously make choices and plan actions to achieve positive systemic impact.
- Teachers are able to express their feelings without imposing them on the students.
- Participation-processes, such as exchange activities with students who may be from other parts of the world, have to include emotions as this will facilitate the process.
- When working with emotions teachers should work with real issues connected to the lives of the students.
- Teachers are aware that feelings are strongly developed through real experiences and interaction with other people as well as the environment, and therefore plan for the student's direct access to such experiences.
- Teachers should stimulate positive feelings (well-being) through specific activities (e.g. in relation to nature) but also take seriously their negative feelings when facing the situation in the world (e.g. feeling of despair, powerlessness). The teacher must develop sensitivity towards the student's situation and needs.
- Teachers should promote openness and confidence that generates a process of positive change in them selves and in their students.

c) Teacher in the Society

- Teachers should be good mediators both in resolving conflicts between humans with different interests in the classroom and the school, and in external relations.
- Teachers are able to communicate emotions competently and in a constructive way with parents and other people from within the community,

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Competences related to Action

Position in the CSCT framework

Action is the process, where all the competences of the other four domains merge to enable participation and networking in SD that result in the creation of meaningful projects. By acting we must be able to apply knowledge, deal with systems thinking, handle emotions and be aware of values. Action, therefore, needs additional special practical skills, abilities and competences in the field of project management and cooperation.

Definition and basic terms

Action in ESD is an individual and social development process based on responsible participation. The action has an educational and a transformative purpose.

Actions as an educational process always include student participation, and the activities are targeted in solving a real existing problem.

A topic suitable for action towards SD should allow learners to:

- experience that SD is full of conflicting interests and changes;
- discuss possible changes;
- find solutions by qualified choices;
- engage in SD and doing action towards SD;
- get experience in self-efficacy in SD;
- reflect upon their actions towards SD;
- gain the capacity for evaluating the action.

Action takes place at different levels:

- Individual;
- classroom;
- school;
- community and local society;
- global.

The following components of student action competence are important (Mogensen,)

- Knowledge of action possibilities.

- Belief that they can have influence.
- Desire to act.

Different definitions exist about action or action oriented learning:

- a) Learning by doing with didactically arranged questions, or the so-called “as if”-problems. The goal is the learning process itself.
- b) Learning by doing through dealing with existing issues and problems. The goals are the learning process and the experience students have of meaningful action and self-efficacy.

In the CSCT-project the focus is on the second definition.

Examples of this kind of action oriented learning of students are illustrated in the “Quality criteria for ESD schools” (ENSI, 2005), for example:

- “ESD calls for practical actions and decision-making - schools cannot only speak about the future but must act for the future. The main aim is to understand how things work in reality in order to be prepared to change them in the future, if required. The outcome can be more or less successful without leaving the students with a feeling of frustration. But when an outcome is reached, and a little dream of change becomes reality because of the joint efforts of the class or the school, it is extraordinarily important to value this change, also for the students who have not participated, and to nurture and maintain the results obtained.”
- “However, besides this more “rational” kind of knowledge there is also meta-knowledge that the students acquire by having been personally involved in solving a real-world problem.”

In the same document the important role of participation is pointed out:

- “Moreover, student participation is central because the teaching and learning process deals with and affects their lives and their futures. However, participation does not mean that the students should decide everything about the project. The important point is to create room for the students’ opportunity to choose to participate at the highest level of his or her ability but with the teacher as the person being responsible for the overall quality of learning that takes place in the allocated time.”

In the German BLK21 programme the role of action, participation and self-motivation is emphasized.

One criterion for choosing topics is the possibility for action. By participation they differ between:

- participation in schools: with students, parents, in the team of teachers;

- participation of schools: with partners outside in community, private firms, others schools.

Interesting in the context of action competence is a new idea of Hartmut von Hentig (2006). He presents a new type of school for 13-15 year old students. During puberty they should work outside in the communities for example for environmental, social or other goals. In this process, they learn by doing something meaningful for the community.

Competences

Teacher as an individual – reflection and visioning

The teacher as a person should;

- be able to imagine alternative futures and new, creative solutions;
- be aware that SD in the present world calls for change;
- be able to act as an “agent for changing”;
- have knowledge about the practice and principles of SD;
- know that SD calls for critical thinking and reflection;
- know that SD calls for individual and social responsibility;
- be able to reflect critically on one’s lifestyle and choices;
- be able to explain his own position and have civic courage;
- be able to work in a project and problem orientated way;
- be able to deal with uncertainty;
- be persistent and be deal with counter arguments;
- be able to network in order to establish teams and partnerships;
- be able to share the responsibility for the teaching process with the learners;
- be able to think in systems.

Teacher in the educational institution – teaching/communication

Teachers should be able to:

- Regard action as an educational value, not only as a way to solve problems.
- Find the possibilities/opportunities for learning processes in the real world especially these topics which fit for action towards SD.
- Define relevant (learners, societies and curriculum) topics for action towards SD and break it down into steps for action; describe conditions in society that can be the reason for action.
- Organize and facilitate local and global action as an individual, in small groups or in communities.

- Organize and accompany learning as a participation process.
- Organize settings which allow learners to:
 - experience different perspectives of SD;
 - find different solutions for topics of SD;
 - identify the direct and indirect consequences and effects of their decisions and actions.
- Organize settings which facilitate the ability of students to experience success and self-efficacy.
- Organize and facilitate learners comprehensive reflection on different action possibilities and on the action process (meta knowledge - meta reflection).
- Organize and facilitate vision processes among learners as the basis for action towards sustainability (imagine a better/another future).
- Promote critical thinking.

Teacher in the society – networking

Teachers should be able to:

- Analyse and describe the local society through SD (Agenda 21 models) models (natural, social and economical).
- Analyse the power relations in local (and global) communities.
- Deal with political situations, think and act strategically.
- Facilitate networking in order to find the relevant knowledge for ESD and to establish partnerships.

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Action Research as Interventional Research in ESD

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By way of introduction, this paper presents some brief working definitions for education for sustainable development, followed by an outline of the concept of “intervention research” as action research. Action research is a strategy to combine processes of development and research.

Education and learning for and through sustainable development

In an attempt to structure sustainable development, it will be broken down into ecological, economic, social, and politico-institutional sustainability. A sustainable society is developed within the framework of a social process of inquiry, learning and shaping. It is essential to organise this process in such a way as to ensure that different ideas and interests are involved in a participatory way. Contradictions, dilemmas, conflicting targets and interests must be renegotiated in a discursive process between all those concerned and for every specific situation. The consensus arrived at is not static in nature, but has to be renegotiated at different times with the involvement of persons and groups concerned. These processes of negotiation and participation will enable a learning process for all persons and institutions involved.

Education for sustainable development is part of the general educational remit to enable every new generation to humanise living conditions. This is based on a definition of education which emphasises the self-driven development and self-determination of human beings in a discourse with the world, other people and themselves. In this context, education for sustainable development refers to the human capability of taking part in the shaping of society in an informed, reflective, and responsible manner, with a view to sustainable future development.

Questions as to how the future may be designed with a view to sustainable development at the local, regional, and global levels, are systematically addressed in concrete activity areas. This means learning on the basis of real-life situations through exact observation, critical analysis, evaluation and taking an influence with the objective of developing “shaping skills” (*Gestaltungskompetenz*) on the basis of information and reflection (cf. de Haan/Harenberg 1999).

It is particularly relevant for the school context that this will, among other things, promote meaningful learning, which - as empirical studies (cf the TIMMS and PISA studies) corroborate - many students currently do not develop. This is an interactive process that promotes both socially sustainable development in a local, regional and global context as well as “higher order learning skills”.

A partnership between research and education

Analyses in the area of sociology of science show that societal practice is becoming increasingly reflective itself. Science and practice are increasingly related to each other, and science is increasingly oriented on practical objectives. This has become necessary as the heightened complexity of social practice can hardly be coped with when research and development remain separate. This also leads to significant developments in the education field: the traditional separation of phases of knowledge acquisition and knowledge application are replaced by the principle of “lifelong learning” (cf. Weingart 1976; Bammé 2002; Posch 2002).

Co-operation between research and education is encouraged further by the oncoming UN decade on “Education for Sustainable Development” (2005 - 2015) and, in the European Union, by EU documents supporting this concept and, consequently, development and research projects funded by the European Union.

Intervention research

A scientific approach which generates its knowledge “on site” in co-operation with the individuals concerned may be designated as “intervention science”, the concomitant research process as “intervention research” (cf. Bammé 2002, Heintel 2002, Krainer 2002, Rauch 2002):

- Intervention research is directly linked to social issues (in this case sustainable development). The point is to not merely apply knowledge previously acquired in practice, but to generate new knowledge on the spot, i.e. in co-operation with others. This type of knowledge could not be significantly generated within the relatively confined institutional boundaries of a university.
- Hence, intervention research is basically process-oriented, and the knowledge generated context-related. Scientific “truths” are not brought in from the outside and “applied”, but generated in continuous interaction and communication with practitioners.
- Intervention research is an attempt to eliminate the institutionalised division of labour between investigators and practitioners that promotes a separation leading to growing mutual dissociation. In this context, the division of science into individual

and specialised disciplines represents just as much of a barrier as a classical, mechanic definition of science.

- Intervention research combines a development focus, i.e. the wish for change and improvement, and a knowledge focus, i.e. the wish to generate knowledge and understanding. It leads to a negotiation of interests and procedures. “Specificising” (Germ. “Verbesonderung”; situation-driven insights and development) takes priority over “generalisation”.
- Intervention research is marked by the fact that some of its developments and insights that have provisional character are directly fed into the research process in small portions via reflection loops. Hence, it has a marked formative dimension.

With reference to existing literature, three types of intervention research (IR) may be distinguished: participative IR, co-operative IR and collaborative IR (cf. Krainer 2002):

Intervention research (IR)	participative IR	co-operative IR	collaborative IR
Research objectives and methodology	Conceived by I, P are aware of it (but are not integrated)	Conceived by I, where necessary modified in agreement with P	Conceived in collaboration by I and P
Data acquisition	Under the responsibility of I; P provides data (but does not acquire them)	Under the responsibility of I; P provides data (self-acquired where necessary)	Jointly or as divided between I and P
Evaluation	Under the responsibility of I, P is informed (but not involved)	Under the responsibility of I, P is involved by a feedback loop	Jointly or as divided between I and P
Publication	By I; P is informed (but not involved)	By I (with reference to P), partly by P	Jointly or as divided between I and P

I = investigators, facilitators

P = practitioners

In the following, two aspects of co-operative intervention research of special significance for bridging the gap between research and practitioners will be described in more detail:

1. The link between the development focus, i.e. an interest in change and improvement, and the knowledge focus, i.e. an interest in generating knowledge and understanding, is an important aspect. Understanding and change are two basic principles to which intervention research is committed. Basically, evaluation and research approaches can be classified by the correlation between these two interests. Given a linear scale, the two extreme ends of the scale could be designated as basic research and action-oriented learning, respectively. It should be added that basic research -- albeit not deliberately -- always implies development elements, just as action-oriented learning always implies new insights and/or stimulates others to develop theories. Between these two poles, the correlation between the two basic principles shifts on a sliding scale. Action research for instance, lies near the development pole, but usually includes more research elements than action-oriented learning. To the extent that investigators input issues that drive research, the knowledge focus will grow in importance and the attention shift from evaluation towards research. The final composition of specific evaluation and research elements depends on the respective context in which the intervention is to occur. Generally it may be said: the individual type of intervention research depends on whether the focus lies on intervention (change and development) or research (knowledge and understanding). At any rate, the greater focus on the research component and the relative autonomy of the researchers is a genuine contribution by the science world. It is probably going to be even more important in the future, since it corresponds to the trend in our society to rely increasingly on science and reflection (cf. Bammé, 2002).

The German variant of action research (cf. i.a. Moser, 1975) may be seen as an example of “co-operative intervention research”. The difference in our understanding of action research lies in the fact that -- in reference to the criteria described by Bammé (2002, p 17) - the German variant considers the “subjectivisation” of the “researched” (and thus the elimination of the “subject-object separation” between the researcher and those that the research is directed at) as something desirable to be encouraged, while action research considers it as a given, a constituent element (cf. Altrichter & Gstettner, 1993; Altrichter & Posch 1998; Posch, 2003). This corresponds with the new phase of development in educational research for schools and subject didactics (cf. Krainer & Posch, 2000) which is marked by reflective rationality, and in which practitioners are increasingly seen as contributors in their own right with a view to education research and subject didactics. A development occurring largely parallel to the 4th phase is a rapprochement between research and politics which is also reflected in the growing significance of “policy-oriented research”. It must be stressed that action research is in no way restricted to practitioners systematically reflecting on their own practice, but may also refer to reflections of practitioner teams on their practice of mutual support, i.e. to self-evaluation-based research on the impact of innovations carried out.

2. Another important aspect concerns the manner in which co-operative intervention research manages the interfaces between ‘research investigators’ and ‘investigating practitioners’. On the part of practitioners, this co-operation presupposes an active interest in research and a certain scientific attitude, linked with the assumption that insights are a precondition for high-quality development. Before changing anything, it is advisable to understand what the current situation is, what the objectives are and what changes are (therefore) aspired to. The central point is how classical research and action research correlate and whether there is something like a common roof, a common basic attitude. In this context, Richard P. Feynman (1987), Nobel Prize laureate in physics, offered an important pointer. Reflecting on the characteristics of science and research Feynman emphasised that it was important “not to fool oneself or others”. This is a plea for a systematic and self-critical reflection on one’s own research actions. There are many pitfalls, one of them residing in the fact that one will get confirmation for the results that one expected to get or even hoped for. In spite of sophisticated tools, researchers in the classical sense of the word are just as susceptible to corroborating their theoretical hypotheses through circular reasoning as action-research practitioners whose evaluation of their classroom work aims at having students tell them what good teachers they are.

3. A third aspect of intervention research is to provide balanced answers to the following four basic questions about the generation and effectiveness of knowledge:

- WHAT type of knowledge is generated: context-oriented, relating to a specific situation or general, generalised?
- WHO owns the knowledge: self-determination or determination from outside for those concerned?
- WHEN will the knowledge be available: immediately and in an emerging process or at the end, as a final report?
- HOW is the knowledge generated: in an interdisciplinary, functional, open manner or in a manner specific to a subject, causally, closed off?

On the first basic question: there is context-oriented knowledge which relates to the specific characteristics of a given situation. If practitioners, for instance, want their students to be more pro-active in environmental studies, they will predominantly be interested in the type of knowledge that helps solve this problem. Since every classroom and every teacher is different, it is difficult to make a generally valid statement in this context. Therefore, practitioners will hesitate to access general, generalised insights, even if they have an important place in science. The problem of generalisation presents itself in a different light when it comes to co-operative intervention research. In this case, generalisation does not mean that one insight will apply to everyone in the same way. Rather, it refers to the fact that insights which concern only a specific issue in the classroom work of one teacher may lead to a generalised insight relating to all classroom activities of that particular teacher. The teacher might, for instance, have recognised a certain pattern which is generally applicable to him or her. Hence, that teacher has made a kind of “specificised generalisation”. If the teacher passes on this insight to other

teachers they may in turn recognise a similar pattern in certain situations in their own teaching practice. Learning a new method (detecting patterns in one's own teaching practice for instance) may also be a starting point for using these elements of reflection in other situations. These are examples of alternative types of “specificised generalisation”. We have to expand our classical understanding of generalisation and become aware of its connections with “specificising” (*Verbesonderung*, cf Heintel, 1988).

The “naturalistic” approach is another way of coping with the problem of generalisation in context-oriented knowledge (case studies for instance). In contrast to the classic theory of generalisation, other conceptions have emerged that emphasise the cognitive content and process of generalisation. The idea of naturalistic generalisation (Guba & Lincoln 1982; Stake 1995) implies that it is the researcher's responsibility to provide sufficient contextual information and a thick description to enable the reader to make judgements about whether or not any particular case can reasonably be generalised to their own specific field of practice (Robinson & Norris 2001).

On the second basic question: is the knowledge concerned a type of knowledge that remains within the confines of practice and offers little opportunity to gain scientific insights? Or does it concern a type of knowledge that is generated in the area of research and will at most be retransferred to practice (linked to the postulation that there is a direct transfer of knowledge)? Intervention research presupposes a negotiation of interests that specifies what type of knowledge is generated by whom and in what form and where it is made available.

On the third basic question: in classical research a research report is submitted at the end of the project. Only then will anyone be able to draw “conclusions” from the results. By contrast, developments and insights can have an immediate impact in intervention research as they emerge continually and gradually and have a provisional character. This being said, a final report does have an important function relating most of all to summative evaluation, related insights and meta-reflection.

On the fourth basic question: in particular areas knowledge can be predominantly generated in interdisciplinary, functional, and open processes, but one also needs a basis which is gained in subject-specific, causal and closed systems of thought (in mathematics for instance). Both types of knowledge generation have their validity, the point is to achieve a balance that is appropriate for the respective context. The way science is organised clearly gives priority to mono-disciplinary approaches. As social practice is increasingly looking for answers to complex problems, there is a need to enhance interdisciplinary, functional, and open approaches. Although basic research will always be important, the question of the impact of (academic) knowledge (cf. i.a. Grossmann, 1997) seems to become a more central issue. Intervention research offers an interesting perspective because it not only combines developments and science, but also uses co-operation to build bridges between the systems of “science” and “education” (or other fields of practice). The practical impact of knowledge is thus part of its mission. The book

Taking steps towards the knowledge society (Nyhan, 2002) points in that direction by arguing that in a “knowledge society” multi-dimensional and collaborative models of knowledge development will replace top-down academic approaches.

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Case Studies: Introduction

The following chapter of the report contains the case studies of the participants of the CSCT project. The twelve case studies are listed in alphabetical order of the countries involved:

Austria

Study 1: “Fueps - Interdisciplinary Project Studies”. An Example for a Competency Based Module in the Curriculum for Teacher Education in Austria

Authors: Friedrich Palencsar & Kornelia Tischler

Institution: Alpen-Adria-University of Klagenfurt, (Institute of Geography and Regional Studies & Institute of Education)

Study 2: University Course “Education for Sustainable Development - Innovations in Teacher Education” (BINE)

Authors: Franz Rauch, Regina Steiner & Franz Radits

Institution: Alpen-Adria-University Klagenfurt, (Institute of Instructional and School Development) & FORUM Environmental Education (University of Salzburg)

Belgium

Study 3: Case Study of Belgium at the KHLeuven Teacher Training Department

Authors: Veerle De Smet, Veerle Gaeremynck & Ruth Wouters

Institution: KHLeuven

Denmark

Study 4: Case Study on ESD at University College CVU-Vest, Denmark Teacher Education at Ribe Seminarium

Authors: Briand Baeklund & Birgitte Sperber

Institution: College CVU-Vest

From Denmark the concept of a second study named “Implementing of ESD at CVU Vest 2006” by Soren Vinding was submitted and discussed but not finished as the Author dropped out of the programme due to retirement.

Germany

Study 5: Title: Study Programme Sustainability - a Way to Impart Competences for Handling Sustainability?

Authors: Matthias Barth, Jasmin Godemann & Anne Busch

Institution: University of Lueneburg

Hungary

Study 6: Revision of the “Environment and Society” In-Service Teacher Training Course in Hungary

Author: Eva Csobod

Institution: Regional Environmental Centre for Central and Eastern Europe

Norway

Study 7: Case Study: “Industry in Telemark”, Course for Teacher Students in Practical Pedagogical Education

Author: Marina Aase

Institution: Telemark University College

Spain

Study 8: Education for Sustainability in Initial Primary School Teacher Education: A Proposal of Innovation

Author: Mercé Junyent

Institution: University of Girona

Study 9: Dialogue Discipline Experience between Dance and Science to Tackle Waste Management

Authors: Genina Calafell, Josep Bonil, Maria Rosa Pujol & Mariona Espinet

Institution: Universidad Autonoma de Barcelona, Grupo COMPLEX

Switzerland

Study 10: North - South Relationship: Past - Present - What Future? A Teacher Training Module

Author: Barbara Gugerli-Dolder

Institution: Pädagogische Hochschule Zürich

Study 11: Case Study FHNW Solothurn

Author: Esther Bäumlér

Institution: Pädagogische Hochschule Nordwestschweiz

Wales

Study 12: Education for Sustainable Development and Global Citizenship in Wales

Author: David Nordcliffe

Institution: University of Wales, Newport

Documentation guidelines for case studies

The CSCT group developed guidelines for the studies at the meetings in Fano (Denmark) and Szentendre (Hungary).

The cases can be different initiatives in pre-service and in-service teacher training but should have at least 2 to 4 ECTS and may cover

- already existing/running initiatives or;
- planning and trial of implementation of initiatives.

The length of each case study should be approx. 10 pages (excl. materials)

Steps	Examples
1. What is the relevant context?	Starting point, institutional context, wider context such as law, position in the curriculum

2. What are the intentions of the initiative related to competences?	What competence areas will be covered?
3. What have we done?	Related to content, teaching methods, methods of student assessment, programme evaluation (if existing), planning, processes to implement the curriculum in the TT institution)
4. How did we research the initiative? (Action Research)	Research questions/focus of evaluation, methods to gather data (i.e. research diary, student observation, interviews, questionnaires), methods to analyse the data
5. Description of empirical data	Notes from research diary, interview data and data from questionnaires and observations
6. Analysis of empirical data	Connection and contradictions etc. in relation to the research question/focus of evaluation. Have we reached our goals? What side effects have occurred?
7. What did we get/learn for future planning?	Outlook / planning for the future
8. Material used (instruments, teaching strategies, tools)	

At the meetings in Barcelona (Spain) and Klagenfurt (Austria) draft versions of the studies were discussed in workshops. Additionally, Peter Posch, Klagenfurt University, an internationally well known scientist in EE and Action Research, gave feedback on the drafts of the studies.

Connections between the dynamic CSCT Competence Model and the Case Studies

The CSCT Competence Model for ESD in Teacher Education and the case studies were developed jointly in the course of the meetings of the project from 2005 to 2007. Although all studies generally deal with ESD as a whole, some of the competence areas were evaluated more precisely. The dark grey fields in the table below show these competence areas in the different studies.

Case-Study	Action	Knowledge	Systems-thinking	Emotions	Values Ethics
Austria, Study 1 <i>(Palencsar/Tischler)</i>					
Austria, Study 2 <i>(Rauch/Steiner/Radits)</i>					
Belgium, Study 3 <i>(DeSmet/Gaeremynck/Wouters)</i>					
Denmark, Study 4 <i>(Baeklund/Sperber)</i>					
Germany, Study 5 <i>(Barth/Godemann/Busch)</i>					

Hungary, Study 6 <i>(Csobod)</i>					
Norway, Study 7 <i>(Aase)</i>					
Spain, Study 8 <i>(Junyent)</i>					
Spain, Study 9 <i>(Calafell/Bonil/Pujol)</i>					
Switzerland, Study 10 <i>(Gugerli-Dolder)</i>					
Switzerland, Study 11 <i>(Baessler)</i>					
Wales, Study 12 <i>(Norcliffe)</i>					

Table: Distribution of competence areas in the different case-studies.

The distribution of the areas evaluated throughout all studies indicate that emotional and value aspects are hard to research at least within the limited resources of the projects. Nevertheless, these aspects should gain more importance in future curriculums, learning concepts and research activities.

FUEPS – Interdisciplinary project studies

An example for a competency based module in the curriculum for teacher education

Friedrich Palencsar and Kornelia Tischler

General intention of the curriculum for teacher education

The planning of a new curriculum for teacher training at the Alpen-Adria-University in Klagenfurt in the late 1990s was a chance to redefine the general curriculum goals based on a qualification profile that would also be developed. The four most important didactical concerns of this curriculum started in 2000 were:

- to give a stronger orientation towards school practice;
- to intensify methodical, social and individual competences;
- to encourage more interdisciplinary teaching;
- to develop group oriented working projects.

Additionally the aim of the curriculum committee's work was to improve teacher education in bridging the gap between knowledge (know-how taught at university) and doing (teaching in schools). Since interdisciplinary and project oriented teaching is becoming more and more important the university has to support this by providing project oriented course units. To enable this, an obligatory "interdisciplinary project study" called FUEPS was developed in which the topical, methodical, social and individual competences of student teachers could be improved in an integrated way. This module has to be completed by the student teachers during the second part of their studies (5th to 9th semester). It is worth six ECTS-Credits (within forty ECTS-Credits for didactic and pedagogy classes) and lasts one academic year.

The proposed module did not meet with unanimous approval. Some colleagues feared that it would cause problems because it would reduce the amount of time devoted to subject specific knowledge. In the end the idea found the necessary support when school teachers, who were in consultation with the committee, argued for it. So, FUEPS was implemented as an important and mandatory module of the curriculum.

FUEPS – Goals of the module

In general the targets of the module can be described as deepening the content and methodical knowledge by interdisciplinary examination of a chosen topic and thus

improving the social and individual competence of student teachers. The main objective underpinning this is to support the development of the student teachers' personality.

The targets can be defined as competences, process oriented and output oriented goals:

The following competences are taught in a holistic and interdisciplinary way:

- 1) The ability to look at a certain topic from different viewpoints ("context rational thinking");
- 2) The capacity for critical (systems) thinking and problem solving;
- 3) The capability to adopt research methods responding to the project goals;
- 4) The ability to co-operate with different people (project team members, experts, and members of the team in charge);
- 5) The know-how to develop innovative learning processes.

The process oriented goals are:

- 1) To encourage the exchange of knowledge, experience and skills;
- 2) To deepen the use of systematic thinking within both the subject discipline and everyday life;
- 3) To strengthen the self directed learning of student teachers;
- 4) To develop ideas for their future teaching which take account of the main aspects of sustainable education.

Output oriented goals include:

- 1) Planning and finalizing a student selected topic with an interdisciplinary approach;
- 2) Written reflection on their learning processes.

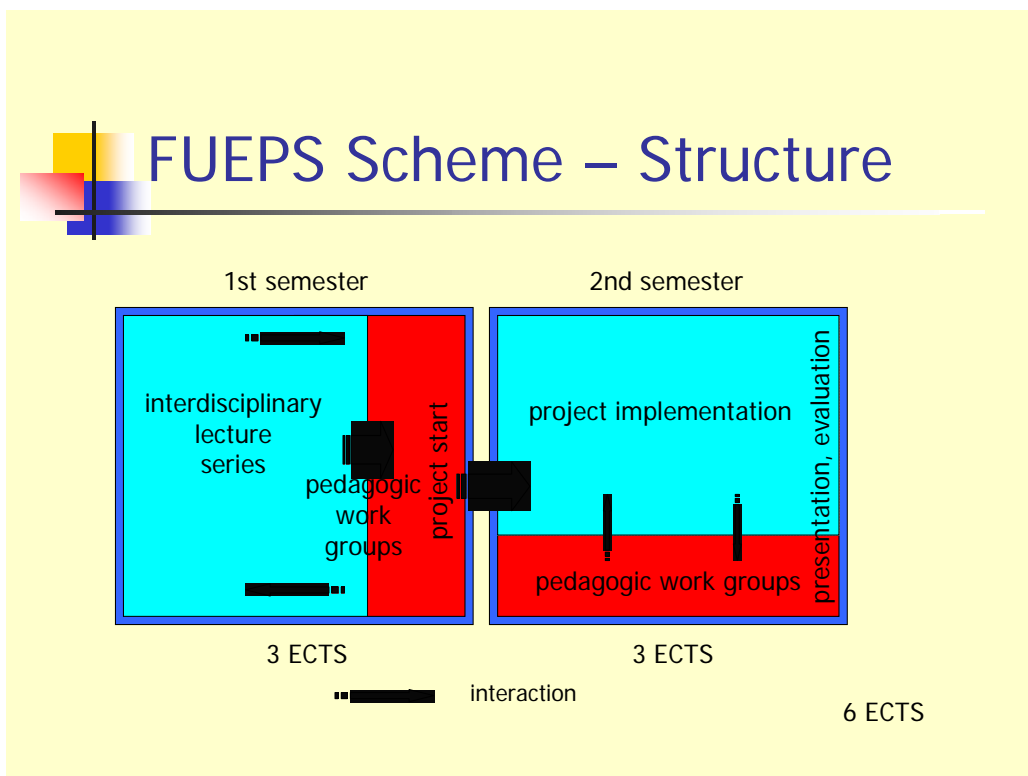
That meant that the team in charge had to demonstrate these goals in their classes in order to become a role model for the student teachers. Different disciplinary approaches were discussed and a great variety of teaching methods fostering the independent work of the student teachers were used.

The proof of reaching the goals would be demonstrated by:

- The quality of product that they had to hand in (portfolio).
- The quality of documentation of the process (logbook, see chapter 4.2 test criteria).

FUEPS consists of four courses which have to be attended in two consecutive semesters. A yearly changing general topic defined by the team in charge of the class forms the framework of the project studies (e.g. play and forms of playing, border, peace, communication). The team in charge of the class provides topical support, assisting the student teachers with their project and grading these projects, and completing all necessary administrative tasks. All areas are planned and executed as a team and the whole team is accountable for all decisions. The inter-disciplinary and inter-faculty team in charge of the class consists of two to three subject teachers and an educationalist.

FUEPS – Scheme and structure



- a) The module starts with a general introduction. This includes information on all organisational areas, the grading criteria and an introduction to writing a “logbook” by using a method of action research. Additionally a first approach to the framework topic based on the every day knowledge of the student teachers is provided. This can be seen in the example of the main topic “Peace” (in academic year 2004/05). The team in charge defined peace in a holistic and positive way. In this understanding peace means not only the absence of war but also a process of non-violence and prevention of violence. The first approaches of the students included finding their own definitions by

mixing a “peace cocktail” and making an excursion to the Austrian Peace Centre Stadtschlaining.

b) The next step was an interdisciplinary lecture series. The aims of this series were to provide diverse perspectives of different disciplines on the chosen theme and to encourage the student teachers to develop an interdisciplinary concept for their own project. The lecture series comprised the following disciplines within the overall topic of “Peace”:

- Culture of peace (German, English).
- Inter ethnic conflicts (Sociology).
- Mathematical models of conflict solution (Mathematics).
- EU - Europe as a peace project (Geography).
- Violence and prevention of violence in schools (Pedagogy).
- Ethnical identity and peace processes (Psychology).

Additionally there were two panels of experts (comprised of all the lecturers). The emphasis of the first discussion was on getting to know the different approaches each lecturer had. The second one at the end of the lecture series was designed by the student teachers who summarised the ideas from the lecturers and asked any remaining questions. At the first discussion it became clear that the student teachers were confused by the variety of approaches. The preparation of the second panel helped them to get a better overview and to understand how to combine the aspects of the various disciplines. Their conclusion was that all the lectures could be seen as the way from “personal peace” to “a world wide peace”.

The pedagogic work/study group gave an introduction to the basic knowledge about project teaching. This included the creation of the project groups, project goals and project plans. The team in charge was clear that the definition of project work was highly significant as this allowed the student teachers to develop the project in a way that paralleled similar projects which were prepared by the teachers.

c) The main tasks in the second semester were project implementation, the presentation of the results and evaluation under the supervision of the team in charge of class. Additional “input on request” phases were included to provide information about further aspects and tasks in the project work.

For example the following topics were chosen by the student teachers from the main topic of “Peace”:

- Using creativity against violence.
- The intercultural game of peace.
- Peace in books for children.
- Winners of the Nobel Prize for Peace.
- Role model of peace and NGOs.

- Peace and the internet.
- Bullying in everyday life.

d) In the final phase the students' logbooks, the project, and the course were evaluated. The focus was put on the advances the students made in topical, methodical, social and/or personal insights. For example the following questions were central because these were the main research questions for the team in charge as well:

- How did they evaluate the deepening of their competences in problem solving, systematic thinking and context rational thinking?
- What benefits did they obtain for their future career as a teacher?

FUEPS – Activities of the team in charge and student teachers

The defined activities for the student teachers were to work on interdisciplinary projects, to work co-operatively to complete their chosen assignment and to reflect on the learning process using Action Research Methods. This was so that the student teachers were then in a position to deal with the framework topic in an interdisciplinary way. The team in charge, therefore, offered lectures from different disciplines, and presented theoretical instructions about project work and team development. Equal emphasis was put on facts, methods and individual learning experiences, on analysing facts and personal opinions and on the curriculum and student teachers' interest. In addition, a combination of different teaching methods and learning activities (e.g. lecture with discussion, panel of experts, brain storming, group projects) was provided.

The project work of the student teachers started with finding their own topic for the project by using brain storming and then clustering their suggestions for topics. After choosing one topic and forming the groups, student teachers had to define their project goals, and to design an adequate concept by using the previously interdisciplinary lectures as well as the theoretical input about organizing project work. They then, if it was necessary, had to modify the concepts according to the project goals. All these aspects were discussed with the team in charge and all student teachers. Sometimes it was necessary to push the student teachers into 'choosing' an interdisciplinary team and methodology so that they could deal with the topic in an interdisciplinary way.

The completion of their plans was characterized by independent acting and discussions between groups and between individual groups and experts or members of the team in charge. These demanded knowledge of scientific methods, flexibility, capacity for teamwork, and a high degree of reliance on the team. It was also necessary to arrange regularly meetings in order to share information, to help with methodical questions, to present the progress of work, to give appropriate feedback, and to debate problems which occurred. Finally the student teachers presented their findings by using different presentation techniques.

In order to show that they had gained social and individual competences student teachers, from the beginning of the module, had to reflect on their learning process by writing a “logbook” (based on the Action Research Method).

Assessment

Construction

Evaluation and grading were based on the project presentation and a portfolio consisting of the following elements:

- A protocol which reflected on the content of the lecture series. Every student teacher had to provide his/her individual protocol.
- The final product and presentation including a description and comment on the groups’ result (per group).
- The whole process was documented and reflected upon by each individual in a logbook which documented the complete work process.

This was done in order to guarantee that in the evaluation and grading social and topical learning were seen as equivalent.

Test criteria

As a basic principle, for all three parts of the portfolio, the quality of the writing and especially the precision of language and expression, is an important criteria.

According to our defined competences and goals (chapter 2.1) student teachers have to build up a framework for their own project that takes into account their timeframe, goals, resources and competences. They use this either as a basis for the construction of new knowledge in specific contexts or to combine existing knowledge in an interdisciplinary manner, in a way that demonstrates their ability to communicate critical thinking, and their willingness to constructively criticise and evaluate.

The diversity of the resources used for the content, the application of methodical approaches (goal oriented, rule guided), and the ability to compare different viewpoints whilst not losing their leitmotif are of particular importance. This needs to be supplemented by an evaluation of whether the project goals were reached or not, and the reasons for success or failure.

As far as the log book is concerned, the criteria for evaluation are the process documentation, traceability and clarity of reflection, the quality of argumentation and the quality and development of further questions. In other words, are the group processes traceable, is all reasoning well founded, are the individual questions well developed from

the original aim, and is the phrasing of the individual learning steps or goals in relation to teaching sound?

Evaluation of the FUEPS

The main research questions are:

- To which degree can the defined goals be reached?
- How is FUEPS seen by the student teachers?
- What is the use of the FUEPS for everyday life and for the future role of the student teachers?

Data collection

Data was acquired in different ways. First, there was a formative and summative evaluation from the oral and written feedback of the student teachers. The oral feedback was recorded by one member of the team in charge. Secondly, the team in charge also produced an oral reflection based on the research questions. The main results were recorded in protocols. All protocols and written feedbacks were analysed by using the qualitative content analysis of Mayring (2000). The data collection included data gained from four previous iterations. Since 2002, 160 student teachers have attended the interdisciplinary project studies. In order to evaluate these the team had to analyse an average of 1500 pages for each of the four years. The logbooks, the protocols of ten evaluation meetings and of the oral feedback at the end of each semester form the basis for the planning of the next FUEPS.

Findings and solutions

The main research question “To which degree can the defined goals be reached?” is the most important for the team in charge as this indicates the effectiveness of the FUEPS, the problems encountered and this in turn leads to the formulation of the changes that are necessary to improve efficiency. As the presentation of the findings includes the data collection of four iterations it is possible to show the problems encountered at the beginning and the solution to those problems.

Corresponding to the defined competences (see chapter 2.1) the analyse of the data shows that the content knowledge is broadened but that the chosen approach is difficult since the amount of information (different lectures) is initially bewildering. This is due to three problems: first, no clear definition is available; second, only in a few cases do the lectures show explicitly the inter-disciplinary links between the theoretical inputs; third, not all lecturers were present at each meeting (time problem) to debate possible relationships between their view points. As these problems occurred from the beginning the team in

charge came up with following solutions: The communication between lecturers in the preparation phase was increased, and written abstracts were required. The team in charge also decided to introduce a second panel in which the student teachers have to combine the content of all the lectures and pose questions concerning the links between them. The student teachers are initially still confused after the lectures because of the enormous range that is covered, but after rethinking the content and finding their own leitmotif, they accept diversity as enriching for their personal life and for their future role as a teacher.

The analysis of the protocols by the team in charge noted that the inputs from the lecture series were sometimes used as starting point for the project topic, but sometimes no input was accepted and in this case new aspects were developed (e.g. Nobel Peace Prize Winner).

Methodical knowledge is deepened in the domain of research methods as it is in the knowledge concerning the implementation of the project method. The comments of the student teachers within their logbooks make clear that the reflection on the structure of the steps taken in the process, the methods used and the collective evaluation of these processes, allowed them to try out relevant methods for project work. The observations of the team in charge and the statements of the student teachers make clear that the biggest problem concerns the formulation of an adequate research question for each project. The student teachers tended to articulate wide, work intensive or unclear project goals. Explicit information within the context of the theoretical inputs improved the situation, but only when the number of meetings of the project groups and the team in charge was increased.

The area of social and self competences has two concerns:

- Communication between the members of the group and reflection of their individual role in the group.

The analysis of the logbooks and protocols show that student teachers gained a lot of new insights about themselves personally. They learned more about their individual competences (e.g. creativity, organizing group work, taking over the leading role), and came to know their limitations (e.g. communication) better. In relation to their ability to co-operate and communicate with the other members of their group they were concerned inter alia with their own effect on others (e.g. *“What effect does my contribution have on the group? How can I achieve something in the group?”*).

- The new relationship between teacher and pupils.

The modification of the student teachers' role - from passive recipients to active participants taking on more responsibilities - and of the team in charge - from lecture to mentor - are necessary pre-conditions to assure success. In the same way

that student teachers move from passive recipients to active participants the lecturers are changing their roles to be facilitators, advisors and critical reviewers (in the context of action research) in one person. In this context the student teachers recognized that there has to be a basic preparedness to give and take responsibility which in turn requires a different mode of communication (e.g. reversible, open to questions).

According to the research question “How is FUEPS seen by the student teachers?” the analysis of the data indicates that a lot of work, especially concerning to time management and organizational matters, is done by the student teachers. In recompense, however, the student teachers gain significant experience and knowledge about the diversity of opinions and facts, how to organize projects, about acquisition of competence in methods, in self efficacy and soft skills. From the students’ point of view the amount of work required for the interdisciplinary project studies, especially when compared to the 6 ECTS points, given is rather high. On the other hand they are ready to contribute the necessary amount of work since they feel that the work they do benefits them personally and professionally.

In addition to these positive results there are also some problems for which solutions are continuously sought. Firstly, writing a logbook is a new experience for most students and it requires regular repetition and examples in order for it to work properly. The main problem is that the student teachers don’t do it regularly. The ability to hand in the logbook in digital form at any time to receive feedback from the tutors has proven to be very effective. By doing it on a more regular basis and by discussing their most important impressions the connection between social and topical learning became clearer and more plausible for them. Secondly, at the end of the project studies the students have to give a presentation on their work, which is difficult because the work of a semester has to be condensed into 15 minutes, and presentations of this form are an unfamiliar task. By showing the difference between teaching and presentation, by explaining the important rules, and adding some tips and tricks the team in charge was able to help them.

Dealing with the third main research question “What is the use of the FUEPS for everyday life and for the future role of the student teachers?” the team in charge found the following results. The student teachers stated that they felt able to implement projects in the school based on the knowledge they have gained about project based teaching. Of particular value to the student teachers was the recognition that whilst it is good for pupils to be acquainted with team development in a group, to learn how to research, perform and evaluate questionnaires, interpret and present data through practical work, this also, if pupils are to achieve the best results, requires a theoretical foundation. Some of the student teachers have already developed different ideas about possible projects they would like to do with their classes (e.g. projects with literature classes, communication and peace projects). Indeed, the general topic of the four iterations led to new and sometimes better understandings for everyday life problems for these students.

Problems to be solved and obstacles to be overcome

For the further development of FUEPS in a more sustainable way there are two open questions to be solved in the near future:

- How can student teachers and the team in charge of the class cooperate with schools? Due to the special Austrian situation of teacher education situated at universities there needs to be more cooperation with schools to increase the element of practical training.
- How to reconstruct FUEPS within a new curriculum according to the demands of BA and MA studies?
- How can the newly founded “Centre of peace and peace education”, the “Centre of German didactics” and “Centre of mathematic didactics” at the Alpen-Adria-University of Klagenfurt be integrated into the FUEPS? Considering that peace, multilingual competences, and co-operation with different teacher in-service institutes are a substantial extension and an important deepening of interdisciplinary project studies.

Consequences for future planning or which factors lead to success?

The experience of the four iterations resulted in the following recommendations from the team in charge:

- Classes of the module as one unit: One basic pre-condition for the success of FUEPS is that the team in charge, taking account of the four classes of the inter-disciplinary project studies, provide unity, primarily by a precautionary and cooperative approach to organization, demands and grading.
- Project oriented working, integrated topical, methodical and social learning as a pillar for concrete implementation: These assume the development from teacher-centred to self-directed learning by allowing the student teachers a high degree of autonomy within their project (e.g. finding their research question, planning the concept, documentation, and presentation). Social learning gets a special position as it is part of the logbook and is central in the evaluation.
- Inter-faculty co-operation in the team in charge: It is especially important that co-operation between the inter-disciplinary team in charge is good, as it acts as a role model for the student teachers. It should be noted that this co-operation is very time intensive because there needs to be a lot of discussion to resolve organisational and topical questions. The additional time consumption is unavoidable as the basic principle is that everything is done as a team and that all members take part in all lectures regardless of their actual role in the class.
- FUEPS is considered as a continually “learning unit”: It has turned out that it is of primary importance to discuss the experiences of both student teachers and the

team in charge at the end of each semester. The findings from these discussions form the basis for improvements and keep continuity over the years.

References only concerning to publications of FUEPS

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TISCHLER K. (2005) Kompetenzerwerb im „Fächerübergreifenden Projektstudium“ an der Alpen-Adria-Universität Klagenfurt. In: Paderborner Beiträge zur Unterrichtsforschung und Lehrerbildung, Band 11 Standard und Kompetenzen - neue Qualität in der Lehrerbildung. Berlin, LIT-Verlag, p. 329-336.

Two examples for general topics, which are published³ including the contributions of the lecture series and the products of the student teacher´ projects.

Theme: PEACE (2004/05)

Contribution of the involved subjects of the lecture series:

- Culture of peace (German, English).
- Inter ethnical conflicts (Sociology).
- Mathematical models of conflict solution (Mathematics).
- EU - Europe as a peace project (Geography).
- Violence and prevention of violence in schools (Pedagogy).
- Ethnical identity and peace processes (Psychology).

Projects of the student teachers:

- Using creativity against violence.
- The intercultural game of peace.
- Peace in children´s books.
- A look at the Nobel prize for peace.
- Peace and the internet.
- Peace role models and NGOs.
- Been mobbed today?

³ PALENC SAR F. & K. TISCHLER (2005) Vom Großen und vom Kleinen Frieden. Erfahrungen aus der universitären LehrerInnenbildung. In PALENC SAR F., K. TISCHLER & W. WINTERSTEINER (2005) (Eds.): Wissen schafft Frieden. Friedenspädagogik in der LehrerInnenbildung. Klagenfurter Beiträge zur Friedensforschung. Drava Diskurs, Drava Verlag, Klagenfurt/Celovec p. 27-60.

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Theme: Communication (2005/06)

Contribution of the involved subjects of the lecture series:

- Group formation - team formation (Business sciences).
- Processes of power formation (Sociology).
- Computer and secrets (Mathematics).
- Gated Cities and communication (Geography).
- The structure of communication in schools (Pedagogy).
- Communication and conflict (German).
- Internet telephone: technology, opportunities and risks (Computer sciences).

Projects of the student teachers:

- Sources of power.
- A detailed look at the communication between teachers and pupils.
- History online - an internet project.
- Intercultural hurdles.
- Conflict and conflict handling - a handbook.

Music in television advertisements - meaning and effect.

University Course – Education for Sustainable Development – Innovation in Teacher Education (BINE)

Franz Rauch, Regina Steiner, Franz Radits

Summary

Like human rights, sustainable development may be regarded as a “regulative idea“ (Immanuel Kant). Regulative ideas don’t indicate how an object is made up but serve as heuristic structures for reflection. They give direction to research- and learning processes. In terms of sustainability, this implies that the contradictions, dilemmas and conflicting targets inherent in this vision need to be constantly re-negotiated in a process of discourse between participants in each and every concrete situation. This implies a great challenge but also has considerable potential to enhance innovative developments in education in general and in teacher education in particular.

Against this theoretical backdrop and according to empirical findings indicating that Education for Sustainable Development (ESD) is barely developed in teacher education, the Institute for Instructional and School Development at the University of Klagenfurt and the FORUM Umweltbildung (environmental education) have conceived a four-semester university program for professionals involved in teacher education and further education (BINE). The goal of BINE is to encourage participants to deal as a “community of learners” with substantial information on sustainable development (SD) and on education for sustainable development (ESD) in a reflected way. Participants should also develop core design skills and methods helpful in the teaching of sustainable development to teachers as well as to position ESD at the teacher training institutions. Participants will also be trained to complete research projects within their own practical experience (action research). The design, evaluation results and analysis of the pilot BINE course of studies (2004-2005) will be presented in this article.

Theoretical Background

Sustainable Development: A Regulative Idea

Based on the Brundtland Report (cf. WCED 1987) and Agenda 21 (result of UNO’s Earth Summit in 1992), sustainable development is the use of resources without compromising the environment and well-being of those who live in other parts of the world (cf. INICED

1992). Herewith is fairness within a generation (intra-generational fairness) addressed as a crucial issue. Furthermore, the material foundations for the next generations should not be destroyed so that they can suitably satisfy their needs and further develop themselves. This is what is meant by fairness between generations (inter-generational fairness). Both dimensions of fairness must relate to local, regional, national and global levels (cf. Temmel 2004). Sustainable development is often broken down into ecological, economical, social and political sustainability in an attempt to structure it.

Let us develop our line of reasoning on a number of common features. A sustainable society will only be achieved through a social process of searching, learning and shaping. It is critical to organise this process in a way that allows different conceptions and interests to be contributed in a constructive manner. Jürg Minsch (2000) points out that this is not a novel phenomenon. “Not even ... the idea of human rights can be finally and conclusively operationalised, but must be reinvented again and again, in its historic context.” Like human rights, sustainable development may be regarded as a “regulative idea“ which inspires social learning and shaping processes. The notion of regulative idea is derived from the German philosopher Immanuel Kant and may be understood as an epistemological construct. Kant (1787/1956) writes: “In this way, the idea is nothing but an heuristic and non-ostensive notion and indicates not how an object is made up, but how we, guided by the same, are to e x p l o r e how the objects of our experience are made and linked to one another”⁴ Regulative ideas thus help us to organise our knowledge and to link it systematically with normative elements. Regulative ideas can also be understood as preconceptions without which no reasonable question can be asked and no problem identified. Therefore, uncertainty is a constituent element of this regulative idea without which consensus would be impossible. In terms of sustainability, this implies that the contradictions, moral dilemmas and conflicting targets inherent in this vision need to be constantly re-negotiated in a process of discourse between participants in each and every concrete situation. The tentative and emerging nature of the idea can delineate an extremely creative, manifold and dynamic field, which is nevertheless oriented in a particular direction.

Education for Sustainability as a Trigger for Innovation in Education

The idea that education for sustainability can be a preconception or regulative idea goes hand in hand with responsiveness in many social areas. Responsiveness, however, does not suggest a complete alignment of the idea of sustainability with those to whom it is addressed; rather, it looks for overlaps with visions and objectives which already exist. For school education and teacher education this means, for example, that sustainable development must tie in with existing conceptions of teaching, school life and the

⁴ The German quote was translated by the author of this article.

relationship between the school and its environment. Thus, dealing with the topic becomes appealing and worthwhile from the inner perspective of a school, as it does not only imply new, additional tasks, but also results in solutions for current problems (De Haan & Harenberg, 1999).

Furthermore, the interdisciplinary nature as well as the present and future relevance of the sustainability debate, with all its inherent dilemmas, uncertainties and confusions, may constitute fertile ground for educational innovation. It is of utmost importance to address the challenge of the vast complexity which results from sustainability and related uncertainties in order to retain a capacity for action without lapsing into simplistic dogmas. While on the one hand sustainability issues are used as a vehicle for innovation in education, they are also meant to trigger concrete sustainable social development processes (Rauch, 2002). This implies a great challenge but also has considerable potential to enhance education for sustainable development.

The Concept of Education for Sustainable Development

One line of reasoning takes up the concept of education for sustainable development in the German-speaking world. According to Gerhard de Haan (1999, p. 5-6), environmental education was conceived as education for sustainability after the Rio-conference in 1992. Thus, environmental education is normatively determined by the notion of a global distribution justice - in addition to the ecological question (waste of resources, environmental pollution, population explosion and the like). A new mix of ecology, economy and social, political and ethical dimensions develops. It is not so much a matter of new content and new subjects of instruction but more a matter of new perspectives and a new weighting of topics. The relation to already existing instruction principles, such as global learning environmental education, intercultural learning and peace education is essential, as well as the interdisciplinary treatment of subject areas which have been taught separately so far, e.g. geography and economics, history and political education, and biology. Here, a reference to the current debate on education can also be made (relating, too, to PISA), in which interdisciplinary aspects in connection with thinking and problem-solving competence and synthesis skills are increasingly required.

However, the term education for sustainable development is also criticised for functionalizing education for the sustainability paradigm. Consequently, it would contradict the objective of a responsible self-determination of each single person. Because of this, Bob Jickling (1992, p. 5-8) rejects any indoctrination and unreflected action orientation, also from the point of view of educational theory. He writes: "Education is concerned with enabling people to think for themselves. Education for sustainable development ... is inconsistent with that criterion" (Jickling 1992, p. 7-8). In her „Didaktisches Konzept - Bildung für eine nachhaltige Entwicklung“ (“Didactic Concept - Education for a Sustainable Development“) Christine Künzli (2003, p. 28) offers similar considerations: "...It is not a matter of changing children's lifestyle towards sustainability,

but a matter of encouraging the reflection on their own lifestyle.“ The „Bildungskonzept für ausgewählte Zielgruppen“ (“Educational Concept for Selected Target Groups“) of the Institute of Environmental Communication at the University of Lüneburg (Stoltenberg et. al. 2004, p. 7) also takes the position that for sustainable development, people’s actions and reflections are of utmost importance. It is not possible to convey sustainability, but Education for Sustainable Development has to distinguish itself through forms of self-organised, project-like, participative learning.⁵

On the basis of considerations of the concept of sustainable development as the regulative idea mentioned above, as well as on the basis of a clear concept of education, the interrelation of sustainable development and education should be outlined as follows: sustainable development is part of a general educational task with the intention to empower the young generation in terms of a humanisation of society. Here, we talk about a concept of education which emphasizes the self-development and self-determination of people in dealing with the world, other people and themselves. ESD relates to the ability to actively shape the environment in a reflective and responsible way in terms of a sustainable future development.

With regard to sustainable development, *education* means dealing with questions in concrete fields of action regarding how the future can be organised in a sustainable way. This includes detailed observation, analysis, assessment and organisation of a concrete situation in terms of creative and cooperative processes. “Reflected action competence“ - and not “blind action“ or unconsidered patterns of action - is a main objective of learning. Ecological, social, economic and political dimensions can be starting points. (Rauch 2004)

Education for Sustainable Development and Teacher Education

A crucial prerequisite for the innovation of schools and instruction as mentioned above is a concept of teacher education which actively contributes to the general aims mentioned above. For this purpose, the course of studies „Bildung für eine Nachhaltige Entwicklung - Innovationen in der Lehrer/innenbildung“ (BINE) (“Education for Sustainable Development - Innovations in Teacher Education“) was developed.

The History of the Course of Studies

The course of studies is based on the research project „Umweltbildung in der Lehrer/innenbildung“ (UMILE) (“Environmental Education in Teacher Education“), which conceived, realised and investigated innovative strategies and didactic settings (action

⁵ The German quote was translated by the author of this article.

research) at six teacher education institutions in Austria. The starting point was investigations showing that in lecture-type education future teachers were scarcely introduced to interdisciplinary instructional principles (e.g. environmental education) because of the predominance of orientation in their respective disciplines. In addition, systematic reflection and documentation of teaching and learning processes were hardly, if at all, developed (Rauch 2001).

In contrast, the BINE course of studies used the following principles of learning (Rauch & Kreis 2000):

- Learning is strongly related to environmental initiatives of schools (co-operation between teacher training institutions and schools).
- Learning experiences build on the previous experiences of students and are influenced by these. This implies the need for the active participation of all those involved in the development of the content and methodology of project work (from problem definition to evaluation).
- Learning is an inter-disciplinary process and not fragmented into disciplines.
- Learning includes a research component based on systematic reflection on actual teacher practice (action research).
- The impact on and change in work cultures and organisational structures are taken into account in the action and reflection processes.

After completion of the research project a network was started to further develop the cooperation and exchange of experiences. The network members, teams (of teacher trainers, teachers and lectureship students) from the research project, participating university institutes and teacher training institutions, were asked to provide mutual encouragement, support and communication with respect to innovative projects on environmental education and sustainable development. It has been shown in the UMILE-research project as well as in the UMILE-network that environmental education (this term was subsequently extended to include education for sustainable development) is generally a fertile ground for the development and advancement of innovations in teacher education (Posch/Rauch/Kreis 2000). However, after a successful period of about five years the development stagnated. Internal analyses and a commissioned external evaluation suggested necessary modifications (Woschnak 2001). There was a need for a shared common task. Those network participants who were not involved in the research project increasingly expressed their interest in the (further) development of research competence. In addition the integration of ESD concepts in teacher education curricula was increasingly demanded and also supported by the Ministry of Education. In order to provide a systematic context for these requests, a course studies, BINE, was developed.

Objectives, Structure and Content of the BINE Course of Studies

The target audience of the four-term course of studies are people working in continuing education of teachers. The participants should acquire subject-related as well as didactic competences for the organisation of teaching and learning processes in the field of education for sustainable development, and become qualified for the planning, realisation and documentation of relevant research projects.

The BINE programme of studies is lead by a team of experts: Franz Rauch (scientific leadership), Regina Steiner (organisational leadership), Franz Radits, Katharina Soukup-Altrichter and Johannes Tschapka. The exam committee is made up of the same group. The completion of the course is documented by a certificate indicating each participant's individual performance profile. This certificate is also recognized as the academic course „Professionalität im Lehrberuf“ (ProFiL) (“Professionalism in the Teaching Profession“) offering the title ”Master of Arts in Education (Instruction and School Development)“ provided by the IUS at the University of Klagenfurt.

In general the executive team considered the course of studies to be an instrument of intervention with which to anchor BNE in teacher education. The course did not emanate from a completed concept for BNE, but rather an inductive approach stressing the process-like, democratic and participatory nature of BNE was represented.

Concrete aims were:

- Critical engagement with the interdisciplinary topic of BNE. Working definition of BNE, identification of future questions as political questions, compatibility of the interdisciplinary subject matter of BNE with subject of instruction.
- Planning, implementation and documentation of a scientific research project in teacher education, which, in following with the sense of action research, should be in close cooperation with the participants' own career-related experience.
- Development of research skills and systematic reflection on own practical experience.
- Examination of teacher education, implementation of new ideas, changes in the participants' own teaching behaviours.
- Introduction to didactic methods for BNE (eg. learning-centered methods).
- Confrontation with and reflection on developments in participants' own organisation.
- Development of learning and research teams in which each participants accepts the responsibility for a colleague's learning process as well (role of “critical friend”).

The participants should also acquire and/or expand on the following competences:

- Content competences.
- Method skills concerning BNE and research.

- Reflection competences (eg. development of a “research stance” with regards to participants’ own job experience and person).
- Development skills in relation to organisation (eg. staging democratic developments).

The design of the BINE course is based on the already established courses “Pedagogy and Subject Didactics for Teachers (PFL)” at the Institute for Instruction and School Development of the University of Klagenfurt (IUS) (Krainer/Posch 1996). The course of studies is an on-going continuing education for teachers in the form of seminars and working groups comprising three modules and a research project and covers 30 ECTS.

The BINE pilot program 2004-2005 consisted of three sections:

Three modules, each five days long, took place in three different locations in Austria. Between these dates, regional groups, each advised by an instructor, met for a total of seven days. There were a total of three regional group meetings. The participants carried out their own research and development in their respective professional fields, which were guided by the regional group instructors.

Module 1

The aim was to bring across three topics simultaneously. 1) an examination of the term sustainable development, 2) an engagement with research, experimentation with methods such as interviews and surveys, an introduction to the hermeneutic circle and analytical discussions and 3) an engagement with the educational process.

Module 2

This module concentrated more on input, dealt with a more abstract of content and treated questionnaires as research tools, education and research spirals, the international discussion on BNE and methods for BNE and the political aspects of sustainability.

Module 3

This model was split in two. In the first part, writing a study was in the foreground, The title of the seminar was, fittingly, “writing workshop”. The participants were provided with a learning environment in which everyone could work at his or her own speed and on his or her own pieces. Participants were aided in quoting, received feedback on their drafts and could communicate with both instructors as well as other participants. In the second part of the last module, participants’ papers were presented and given feedback. They also took a look back on the entire course of studies.

Regional Groups

The regional groups served to examine the terms presented in the modules more in-depth with reference to participants’ own experience, their research and the friendly feedback

and responses (critical friends). There was feedback on the rough drafts, which was directed by the group leaders in plenum, as well as on a one-to-one basis with the instructor.

Evaluation Concept

The course is evaluated in formative and summative terms with internal and external components. For the purpose of internal evaluation, questionnaires on the course, which provide insight into the participants' qualifications, motives, aims and expectations related to the course of instruction, registration and the first seminar, were designed by the leadership team. At the end of each seminar written and oral feedback were gathered from each participant. At the beginning of the first module and at the end of the third module Group interviews with selected participants, were conducted at the beginning of the first module, at the end of the third and at the end of the course by an external evaluator. This same evaluator was also responsible for evaluating the five PFL-courses at the IUS which were being offered at the same time in order to facilitate comparisons (cf. Erlacher 2006).

Participants and Motives

In 2003, during the start of the first BINE course, three one-day symposia on „Bildung für Nachhaltige Entwicklung - Möglichkeiten und Chancen für die LehrerInnenbildung“ (“Education for Sustainable Development - Possibilities and Chances for Teacher Education“) took place in three cities in Austria (Salzburg, Graz, Baden). There, the programme was presented in the form of lectures and workshops and more than 30 people became interested in taking part. 21 of them started the course. The participants came from initial and continuing education teacher training institutions. The school subjects of the participants covered a broad spectrum ranging from natural sciences to humanities, specialised didactics to teaching practice. The most important reasons for participation in the course of studies (on basis of the registration questionnaire and the first series of interviews with participants) were:

- Personal interest in the development of research competence as well as in education for sustainable, didactic innovations.
- Further qualification in order to secure employment at the forthcoming Pedagogic University⁶.

⁶ In 2007 the Austrian institutions for initial and in-service teacher education were transformed into Pedagogic Universities. Research qualifications gained in the course of

- Communication with colleagues.

General Feedback Regarding the Development of Competences

In the external evaluation based on interviews with participants the following quote appears. “In discussion with the participants, it is clear to see that they were able to profit from the diverse...learning dimensions in the course of studies. In addition to the acquisition of scientific research tools and a content-based broadening of horizons concerning sustainability, the participants profited from the evident use of “learning from experience“ in connection with ample opportunities for reflection and a theoretical localisation of the same. They feel encouraged to apply their acquired “process knowledge“ to their experiences with education of pupils, students, and teachers. In their individual areas, these also have good possibilities to be implemented. (Erlacher 2006, p. 9).

Based on the formulated skill fields above, the participants, from their own point of view, seem to have profited regarding content-based skills of ESD, didactic and research-based methods skills, reflection skills and to a certain degree, development skills. Further accomplishments should provide more in-depth indications about the learning process.

Feedback from the 1st module

At the end of the week, participants were asked to answer three questions:

What worked well? Among the 103 positive responses, the “variety of methods“ and “the variation between independent work and theoretical medium“ (13 responses) were cited as being successful. In addition, the research work in small groups (10 responses), as well as the opportunity to strengthen personal connections to the topic SD/ESD (5 responses), were also assessed positively.

What didn't work? There were a total of 29 negative responses. For some, the module was „too dense“ (4 responses). Others would liked to have had “more or longer theoretical

studies aid in finding or extending existing employment. For some participants it was also important to be able to obtain a master`s degree building up on BINE.

input” (5 responses) or a “clearer definition of terms“ (3 responses). For some participants, the reflection time was not long enough (4 responses).

What did you gain from this module? 17 participants responded that they gained research competences. 12 participants cited the development of the terms SD and ESD. A few quotes from the participants responses: “The terms became more tangible and were given meaning.” “So many things were clarified. The module also triggered my desire to read up on this field.”

Testimony from an external evaluation supports this view. “At the beginning, some of the participants found the process-open approach of the seminar irritating (taking in to account the participants’ expectations of a fixed structure). After some time, however, they grew to view it not only as its own field of learning, (‘...thus the process of being open’), but also increasingly in connection with a lasting position (at least in the sense of desideratum) in their own area of work. This methodical approach in the execution of the seminar stimulated several learning processes, above all, a process-consciousness for learning settings, that was perceived on the one hand as very helpful (‘...the open structure of the seminar was encouraging for me because it worked with the participants’ recourses’), and by some as essential in the scope of teacher education (‘everyone who was involved in the BINE program went through a process...I think it’s important in teacher education to go through such processes. If you want to guide students to get involved in a process, then you have to go through all the aches and pains, the highs and lows yourself’). (Erlacher p. 8)

Feedback from the 2nd module

The evaluation of the second module shows an emphasis on the research project. The participant’s focus shifted to the studies they were working on and the necessary research skills:

From the 67 positive comments, 18 focused on the content and methods offered during the seminar, 15 on the design of the seminar, and 10 on the teamwork. From the 29 negative comments, 13 were displeased with the time pressure and 7 with individual presenters. From the 36 comments concerning personal gain, the better part dealt with increasing and improving research skills.

In the team’s reflection it became clear that the overlying topic “Dilemmate“ strayed off course during the second module. Perhaps some of the possible reasons were the high complexity, the various goals (SD, ESD, the study, research) and the meta-level in the context of teacher education: We support teacher educators, so that they can support teachers, who in turn implement ESD with their students--the second meta-level).

Other reasons might be that the demands of the research project took precedence over the other content, and that the many participants’ interests lay in research, as the initial

questionnaire indicated. It could also be that the topic ESD was not dealt with intensely enough and therefore left less of a mark in the feedback.

As a consequence of these evaluation results after the second module, the topic of ESD was emphasised in the regional groups discussed later. The participants were encouraged to grapple with the concept of ESD in their studies and to place their project in the discourse of ESD. The question “What is ESDE and what is it not?” was repeatedly posed, particularly by the regional group leaders.

In the final evaluation “temperature curve“ (reflecting on the entire duration of the program) the second module received the highest ratings. Comments include: “BINE and I ... it’s getting clearer and clearer”, “diversified, very motivating and informative”, “I really enjoyed the group and the leading team. great content“ ,”a variety of impulses from experts, but rushed”. On the one hand, this could have to do with the fact that lectures and impulses are less unsettling than independent work—which corresponds with the participants’ desire for a “common thread“ or a “clear structure“ (cf. Erlacher p. 3). On the other hand, it might also have to do with the typical progression of a group process, which begins with an orientation phase with struggles for positions, followed by a phase of trust, during which the process normalizes itself. This second phase may have been reached during the second module.

The future workstation, for example, was met with great response. In this context, it was also interesting to see the performance of the participants during the graduation ceremony. Each of them presented a very optimistically-worded statement “a look back from 2014 at 2005, when the BINE programme was over.“ (A strategic component can also be seen in this, as political decision makers were present at the event, and the message was probably directed towards them. It can be seen as intelligent lobbying).

Feedback from the 3rd Module

In the 3rd module’s feedback, the good working environment, the appreciative spirit, the communication and the helpful responses were mentioned in particular (20 out of 27 positive responses). The leading team was successful in encouraging a respectful and appreciative atmosphere throughout the entire program, which was an essential aspect of ESD for us.

Regional Groups

The regional groups, learning with and from each other, were a central element of the program. The regional groups were judged, in retrospect, as “unsettling” (time and again, things needed to be rethought) but also as “impulse triggering”. The later regional groups were criticised by some as being a “perpetual repetition”.

Those participants who were interviewed by the external evaluator, though, assessed the regional groups positively: Most of the participants valued the work done in groups, especially in the regional groups, and view the opportunity to communicate on a national level with colleagues from different institutions as personal enrichment. “For me it was productive because it was exciting to have the opportunity to converse with colleagues from other fields and also because a lot of time was allotted for this“. (Erlacher 2006, p. 6)

The Studies

Completing a study can be seen as an essential part of the creation and development of specific skills. “The necessity of creating a study triggered, in those questioned, a learning process, in which there were, here and there, orientation difficulties (‘...What am I doing? How should I be doing it? How can I work with the information that the instructors give me?’) Eventually, however, everyone managed (some to their own surprise) to produce a quality product (‘...I was totally surprised that I wrote that much’). In the course of conversation, the idea arose that the necessity to complete a study functioned as security-fostering in an otherwise relatively vague and open learn setting. (Erlacher 2006, p. 9).

Comparison of Initial and Final Questionnaires

When the initial and final questionnaires are compared side-by-side, it can be seen that nearly all expectations were fulfilled.

In response to the question “Were your expectations met?“, Ten participants wrote explicitly that they had broadened their research skills, six that they could see personal further development, three that they were able to solidify their understanding of BNE and sustainable development, and two mentioned particularly helpful and cooperative communication.

The weighting of the topics didn’t shift in the final questionnaires either, i.e. the broadening of research skills was one of the program participants’ initial fundamental motivations, and this was also fulfilled in the course.

Further research, reflection on their own teaching, instructional development, and networking were all mentioned under the topic “perspectives for further development“. Eight wanted to continue their education in research, some of which specifically were planning on participating in the masters course. Five had perspectives concerning instruction development and two valued future networking. In addition, very personal realisations were also mentioned: “putting forth my strengths/ no longer having to do ‘everything’” and “the journey is the reward.”

The participants' fields and subjects were very diverse, which led to a wide array of different project topics. This was viewed by some as positive, as a broadening of horizons. Others felt that reciprocal encouragement in the regional groups was hindered, as some participants had difficulty putting themselves in such foreign fields.

Regardless, when comparing the initial and final questionnaires, the statement "interdisciplinary co-operation is an important part of ESD" ranked higher after completion of the program.

There are varying estimates as to the implementation of the innovation in the institutes. On the one hand, the limitations of support possibilities from the part of the program were realistically appraised (The implementation of research will rest with us, sometimes it will be successful, sometimes it won't). On the other hand, though, high-ranking educational officials will also have to take responsibility. It also becomes clear that the program urged some participants to critically reflect on the system contradictions within schools, academies and the educational system, which then brought to light that the target key skills, such as critical faculty, personal responsibility, etc. are thwarted by the organisational framework "... but I serve them [the teacher candidates] using the old system, which undermines these skills ... It's a contradiction." (Erlacher 2006, p. 10).

Summary: Discussion and Consequences

- The results of the evaluation can be understood as a validation for the chosen participant-centred, experimental and reflective approach.
- The evaluation of the second module indicated a difficulty concerning research competences for the independent projects and studies. It would be important to make clear the use of action research not only as a research tool, but rather as ESD content, in the sense of emancipated, democratic, and reflective didactics. Interestingly enough, the assessment shifted when reviewing the program. In the final assessment (a "temperature curve" for the entire program), the second and third module were both assessed with higher marks than the first module. Comments included "insecurity, confusion, uncertainty". In the second module, the plethora of information was seen in retrospect as positive (despite the time pressure). It is possible that the uncertainty in the first module and also in the regional groups was fundamental for the process of change that the participants underwent during the program. This can clearly be seen in the development of the studies.
- In program design, how can a balance between the participatory and self-determined work of the participants on SD and ESD be established and still create enough uncertainty to challenge the participants to question their previous experience by creating a confrontation with a plethora of topics, concepts, and methods of ESD?

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Case Study of Belgium

Veerle De Smet, Veerle Gaeremynck and Ruth Wouters

The context within the institution

In our society there is a strong need for sustainable thinking and acting, and Education cannot stand aside in this socio-cultural evolution. We believe that education is a mirror of society, but at the same time, education must also show - as in a mirror - what can be in the future.

Our teacher training department has chosen an interdisciplinary approach to work on sustainable developmental education (SDE) from a social orientation.

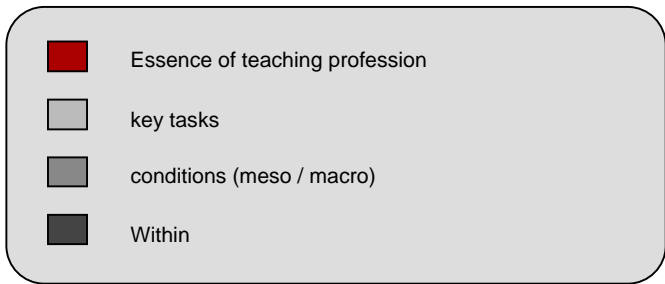
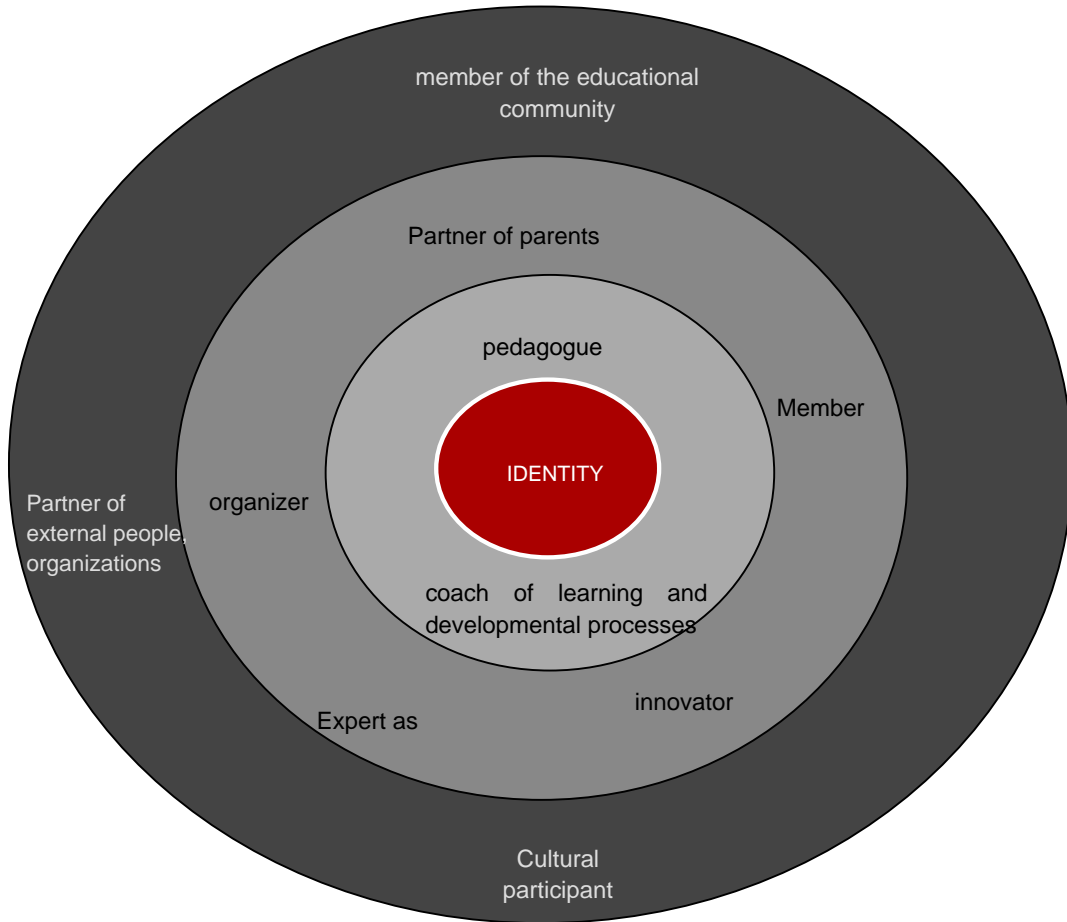
SDE is one of the main topics we have as a compulsory subject (called “School within society”) for all our students at the Teacher Training Institute, one of the departments of the Katholieke Hogeschool Leuven. Sustainable development is also part of the mission of the whole college⁷.

Within our institute we work with 10 *basic competences* for teachers that are imposed by decree. These 10 basic competences have been incorporated in a model by the different teacher training departments within our institute. In the centre of the model we find the “*professional identity*” of the teacher: the knowledge and skills of a teacher should be supported by professional attitudes such as engagement, enthusiasm, consciousness of values, etc. The key tasks of a teacher are being a pedagogue and a coach of learning and developmental processes. In order to be able to fulfil these tasks the teacher need to be a specialist, an organizer, a team player, a partner of parents and also an innovator. Finally the teacher is part of society and plays an educational, political, cultural and social role in that society.

The subject “School within society” appeals to many competences of a teacher but focuses especially on the tasks of the teacher as a partner of the external world and as a cultural participant.

⁷ See also micro-website of the KHLeuven: www.duurzaamhogeronderwijs.be (‘duurzaam hoger onderwijs’ means ‘sustainable higher education’)

In this case study, we focus on the curriculum of the 350 students who will graduate as Professional Bachelors in Teacher Education for Secondary Schools. This means that our students will be teachers of pupils from 12 to 16/18 years old.



The interdisciplinary approach, exceeding the limitations of different subjects, is also imposed by decree on all Flemish schools⁸. Thus, “learning to learn”, “social skills”, “environmental education” and “civic responsibility” are specific objectives of secondary education. This is why we want to make future secondary education teachers familiar with interdisciplinary methods, including project learning.

The Bachelor degree is organised over 6 semesters. We distinguish between the common curriculum (meant for all future teachers of the institute) and the specific curriculum (different for preschool, primary and secondary education students).

A common subject called “School within Society” appears in 3 of the 6 semesters. Three ECTS credits - this corresponds with 90 study hours - (out of a total of 15 credits for the common curriculum, besides 45 credits for the specific curriculum) are allocated to this subject each year of the teacher training (semester 1, 4 and 6⁹).

In this subject students have to approach a relevant socio-cultural theme from different points of view. We want students to question themselves and others in order to reach a deeper understanding and develop a personal opinion regarding social, cultural, political, ecological and economic issues. They also have to focus on networking by contacting organisations, institutions and experts outside the school environment. The emphasis lies on “research in action” and “team learning”. They have to be able to transfer the subject matter into the social context and link the different domains of SD.

The first semester of teacher training (School en Wereld 1) focuses on the development of the personal competences (development of a deeper understanding of a societal issue that they have been exploring at a personal level and learning to do research within a small group). Students stay within their own level of the institute when working on SD problems.

During the fourth semester (School en Wereld 2), students will have to translate information on another socio-cultural topic into activities for secondary school pupils (taking the action into the classroom or school by implementing a project about their topic). The students are part of an interdisciplinary project and step into the world of educational practice (translation of SD problems to pupils).

In the final semester of TE (School en Wereld 3), we want them to learn how they can implement sustainable development within their own teacher practice (how to change the

⁸ See www.ond.vlaanderen.be/dvo

⁹ The learning trajectory and the organisation of other subjects and practical exercises are the reasons for the jump in the semesters.

situation, how to take action, how to encourage pupils to think and act sustainable). In their final year, students will have a choice of options, such as: organizing and preparing a multicultural trip abroad, an international exchange program, internationalisation at home, an artistic project, a global education project or a project within the immigrant environment in co-operation with an organisation or educational institution. They also have to make a portfolio of their activities in which they prove their competences.

Students then step into the world outside the institute/school by doing a work placement practice in an organisation/company/ngo with a focus on SD.

The practical implementation of this final year is still a work in progress. Therefore we will only focus on the first and the fourth semester in this case study.

In our action research we will try to find out whether the SDE initiative realises the learning objective.

Aims of the initiative

	Output aims	Process aims
1 st semester (level of the institute)	<ul style="list-style-type: none"> • to deepen understanding at a personal level of a case study concerning an SD issue by clarifying values, gathering information and reflection • to work and learn as a group. To be able to work together in a team to discuss SD issues within the framework of a project • to be able to approach a case study from different aspects of SD (ecology, social and cultural justice, economy, good governance, ...) • to propose a solution for the case that is as sustainable as possible 	<ul style="list-style-type: none"> • to develop attitudes towards a personal involvement in local and global issues, on short and long terms • to develop research and text transformation skills • to develop the capacity to examine reality independently and with a critical mind, at school as well as outside the classroom by project learning • to clarify values (...)

<p>4th semester (translation of SD-problems to pupils)</p>	<ul style="list-style-type: none"> • to adapt information on SD issues for pupils in secondary education • to have the capacity to examine reality independently and with a critical mind, at school as well as outside the classroom • to realise project days on SD issues for secondary education pupils with workshops and information stalls 	<ul style="list-style-type: none"> • to show an open and moral attitude towards the society, the culture and the world • to grow from subject oriented teaching towards interdisciplinary teaching
<p>6th semester (the world outside the institute/school)</p>	<ul style="list-style-type: none"> • to learn to solve problems from a sustainable (social, economic, ecological) point of view within the framework of a project • to show understanding and participation in broad social developments • to take a stand in front of an audience of pupils and experts • to do a work placement practice in a organisation/company/ngo with a focus on SD 	<ul style="list-style-type: none"> • to present innovative ideas that can be implemented in education • to have a personal engagement with SD issues and sustainable action

What have we done?

The learning environment of the 1st semester (“School within Society” / the level of the institute)

<p>Contents and learning steps</p>	<p>Methodological approach</p>
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<p>Introduction to the course (aims, concept, presentation of an SD case study, forming groups of 5-6 students)</p>	<p>Presentation Problem approach Ice breakers Group discussion</p>
<p>Problem analysis of the case with a focus on SD-concepts and formulating research questions within each group</p>	<p>Seminar on SD Brainstorming to determine the main issue in the case and its different sub-themes Group discussion to clarify values Working at the group diary</p>
<p>Individual and group research (literature, websites, interviewing experts, visiting relevant organisations) in order to find answers on research questions Reflection on the group processes</p>	<p>Seminar on doing research; Individual and group research and completion of the research portfolio Coaching of the different groups by the responsible lecturer. The coaching can be 'live' or on the e-learning-platform. The object of coaching can be the content of the research portfolio as well as the group processes Peer assessment within the groups</p>
<p>Introduction to interdisciplinary thinking and acting; the SD case from an interdisciplinary point of view</p>	<p>Seminar on inter-disciplinarity and system-thinking Individual pre-tasks followed by group discussion Coaching of the different groups by the responsible lecturer</p>

To combine information on SD and inter-disciplinarity; to formulate solutions/answers that are as sustainable as possible	Individual pre tasks followed by group discussion To write a group paper containing arguments and conclusions on the case study Coaching of the different groups by the responsible lecturer
To present the gathered information and the sustainable solutions to the entire student group	Presentations Discussion and feedback on the presentations of other groups
Reflection on and evaluation of the group process	Group diary and peer assessment
Outcomes	
<p>To compose a research portfolio about the case study selected. The portfolio will contain problem analysis, sustainable solutions to the case, evidence of the sustainability and relevance of the issue to education and schooling.</p> <p>To produce a group diary with time sheets, minutes of the discussions and peer assessments.</p> <p>To produce an individual paper with pre-tasks, reflections and creative proposals concerning the case.</p> <p>To give a short presentation of the results for the entire student group.</p>	

Summary of the evaluation of the project

What?	Marks?	Who evaluates?
Information brochure	20 (group mark)	Responsible lecturers

Individual paper	20 (individual mark)	Responsible lecturers
Group diary	10 (group mark)	Responsible lecturers
Short presentation	10 (group mark)	Responsible lecturers
Peer assessment ¹⁰	The average of all peer scores has an influence on the total individual score	Peers

Evaluation criteria

- Using the SD terminology in a correct way;
- Giving proof of converting the information into a personal and constructive paper;
- Giving well grounded arguments of the educational relevance of the solutions;
- Proving the SD relevance of the explored issue;
- Proposing sustainable alternatives to their issue;
- Using a variety of present-day sources;
- Consulting living sources;
- Distinguishing between facts and interpretations (on the one hand) and taking a standpoint (on the other hand);
- Presenting a correct and visualised summary of the explored case.

The learning environment of the 4th semester (School within Society' / translation of SD-problems to pupils)

Contents and learning steps	Methodological approach
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¹⁰ Each individual evaluates the processes within the group (standard form to survey the process indicators of group work) and also scores every member of the group (standard form with evaluation criteria). See annex.

<p>Choice of an umbrella theme (project) and identification of different sub themes</p> <p>Approaching SD from an environmental, social, political, economic, cultural point of view</p> <p>Students need to be involved in the decision making process regarding content, processes and outcome thus creating ownership</p>	<p>Brainstorming with a delegation of students and lecturers to determine the main issue and its different sub themes</p> <p>Formation of a steering group (3-4 students who are not part of a specific project group but who support the management of the whole project)</p>
<p>Sensitization of the entire group of students about the main issue</p> <p>Explanation about the course of the project the goals, expectations, evaluation criteria, planning and evaluation of the project</p>	<p>Students choose between ten different issues/problems (related to the umbrella/main theme)</p> <p>A limited number of students per major per theme in order to try to stimulate the interdisciplinary thinking and confront students with the different angles (or lenses through which we look at SD) within the project (10 themes x 12 students)</p> <p>Planning of the project: each group of students plans a procedure to gather and process data and documents and motivates the procedure</p> <p>The syllabus of the project is also available on the e-learning-platform</p>
<p>Process data - research period</p> <p>The students work on the project within their groups, making arrangements and gathering information</p>	<p>Problem approach to do research on their theme</p> <p>A responsible lecturer observes and supervises the processes and final results of each group</p> <p>The timetable provides moments for deliberation and reflection</p>

<p>Progress evaluation (product and process): coaching and evaluation is planned for all project groups. This is a moment of guided reflection for all students (state of affairs and correction)</p>	<p>Feedback and feed forward on the gathered information</p> <p>This coaching includes training sessions for skills, taking a stand, producing a video, developing a website, creating a digital presentation, etc.</p> <p>Peer and self assessment instruments</p>
<p>Realisation of the project</p>	<p>Taking a stand, producing a video, developing a website, creating a digital presentation, building an information stall, defining a participatory action, etc.</p> <p>Final evaluation and reflection</p>
<p>Outcome</p>	
<p>Realisation of the project</p> <ul style="list-style-type: none"> • put together a project information brochure and define a participatory action (on an educational, social, political or cultural level) that can be undertaken by the pupils relating to the case; • develop a website or produce a video/documentary/digital presentation about the theme for primary or secondary pupils; • set up a workshop for the pupils; • build an information stall with instructional and educational materials in a chosen elementary or secondary school about the issue; • guide pupils through the information stalls by offering them challenging tasks. 	

Summary of the evaluation of the project

What?	Marks?	Who evaluates?
Information brochure	20	Responsible lecturers

ICT-application (making a video, constructing a website or making a digital presentation)	20	Responsible lecturers
Information stall and workshops	20	Jury of students visiting pupils, teachers, experts of organisations
Peer assessment	The average of all peer scores has an influence on the total individual score	Peers
Self evaluation	The profundity of self-reflection influences the total individual score	Responsible lecturers

Evaluation criteria

- Translating the information into a personal and constructive paper.
- Using a variety of up-to-date sources.
- Consulting living sources.
- Distinguishing between facts and interpretations (on the one hand) and taking a standpoint (on the other hand) during the public debate.
- Translating the SD relevance of the explored issue to pupils.
- Proposing sustainable alternatives to the issue during the workshop.
- Presenting an information stall of the selected case in an attractive and visual way.

How did we research the initiative?

Our research hypothesis

For semester 1

The profundity, personal processing and correctness of relevant information within the research portfolio strongly depends on how the group is functioning as well as on the individual contribution of each member within the group.

The course facilitates interdisciplinary knowledge and thinking and initiates students in the notions of SD.

For semester 4

After doing research on their own level, students must be able to adapt the accumulated information for pupils of secondary education.

Students learn to work in an interdisciplinary team with interdisciplinary SD issues using methods for active learning.

The decision making about content, processes and outcomes, by creating ownership for the steering group, adds value.

Description of empirical data

For semester 1, we rely on the following data

- The *questionnaire*: in the final session of the course “School within society 1” (2005-2006) we questioned the students. 123 students out of a total of 136 who attended the course responded to the questionnaire. We consider the data as representative. The questionnaire related to the content, the learning steps and the methodological approach within the course. [Appendix 1](#) shows the results of this questionnaire.
- The *group score of the research portfolio* about the explored case study.
- The *peer assessments* of the student groups: students had to score each other concerning different aspects of the work within the group (see appendix for blank version).
- The *individual scores* of the 136 students.
- Our own *observations* during the course in the classroom and on the learning platform.

For semester 4, we rely on the following data

- The *individual scores* of the 114 students for the 4th semester.
- The *group scores* for the 4th semester.
- The *questionnaire* of 80 students out of a total of 114. [Appendix 2](#) shows the results of this questionnaire.
- The *results of the visiting pupils and teachers* concerning the information stalls and the workshops.
- Our *own observations* during the course in the classroom and on the learning platform.

Analysis of empirical data

For semester 1

The average of the results of the first year students for 'School within society' was 11.67. 13 students failed. This means that the majority of the students passed this course and acquired (if we may consider our assessment as valid) the postulated aims (see above for the output and process aims).

The scores varied between 7/20 and 17/20. Some of the groups did very well (e.g. all the students of a group got 14/20 or more).

In one group all students failed, but the remaining students who didn't pass were part of different groups. As mentioned before, the individual score of each student contained a group score who was influenced in a positive or negative way by peer assessment. The results of this peer assessment were, for these students, the main reason for their bad result.

In the groups where all the students had almost the same results, the peer assessments showed a good functioning group process: tasks are correctly divided and executed on time, students listened to each other and respected each other's opinion, and students showed interest in the case and worked on realistic solutions...

The questionnaire we used had a simple yes or no format however, if the student wished to expand on their answer, they had the opportunity to do so. Appendix 1 only contains the number of yes-answers and the number of no-answers on each question, not the written answers.

We consider it as a good score if more than 60% of the students answered the question positively. Therefore we consider that the following items were achieved: learning to plan, learning to work with interdisciplinary aims, working on an actual issue and clarifying their point of view as a result. Only half of the total student group indicated that the course facilitated learning to work in group, understanding SD on a deeper level and understanding the notion of culture on a deeper level.

We also note that the e-learning platform -where we put on the most important background information- wasn't consulted often. Students were free to seek and consult this background information, but only a few students did so.

Students also mentioned (written or oral) that 'School within society' was a complex course for them. Not only was the content new, but most of them weren't familiar with these kind of learning processes. Time management was according to their complaints a problem in almost every group.

With these data in mind, we can conclude that School within society facilitates by an important number of first-year-students interdisciplinary knowledge and thinking and initiates students in the notions of SD. However, we must be attentive to the rather limited number of students who got a better understanding of SD.

For our second hypothesis, we need more research, but we can already say that the way a group functions has an important influence on the profundity, personal processing and correctness of relevant information that the students need for the research portfolio.

To make the complexity of the course and the tasks more comprehensible and conceivable for the students, we transformed the project in a more case centred task. The student-groups get a realistic, but open end task which they have to solve. To help them closing the gap between the case and the open end-tasks, they get a step-by-step-guide. This way, we try to guide and coach them more then we did last year.

We will also increasingly use an e-learning-platform where we put the most important background information. This year a part of the important information is not any more mentioned in the manual but only digital consultable. We also made the e-learning environment a bit easier and more structured since we observed that this platform wasn't consulted often.

To solve the problem of time-management, we will give the students a very clear time path with regular milestones, mainly weekly base tasks. Each group has to prepare the tasks a few days before the sessions. We call it "previous/preparatory tasks", so in the classroom we can already build on some foreknowledge of the subject.

To give the students more insight into the concept and meaning of sustainable development, we made a part of the task more explicit devoted to this concept and its implications.

For semester 4

Each year we question the students and lecturers who are involved in the project. Their considerations stimulate us to improve. During all those years there have been considerable changes in the planning and development. We consider this to be "action research" on the level of teacher training. This will help us to implement "school within society" in the fourth semester of the professional bachelor TE.

At the end students also need to evaluate the entire project. Topics they have to consider are: the contribution to and content of interdisciplinary work and active learning, the idea and realisation of project learning, the planning, what they learned from it and what will be useful in their future practice, the significance of the project results and the problems they dealt with. Appendix 2 shows the results of this questionnaire.

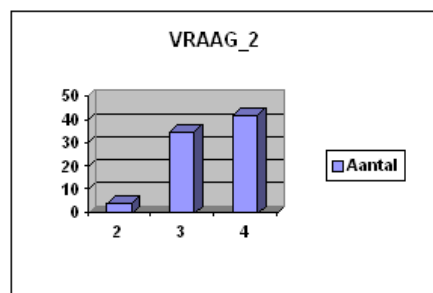
Strengths

By questioning we discovered some strengths such as:

Project working stimulates *interdisciplinary* work and thinking (question 2).

Question 2: This project really invites to interdisciplinary work and thinking. How did you try to realise this?

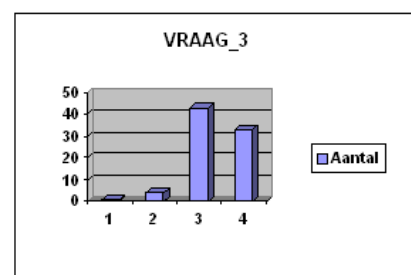
Over 90% of the students indicated that this method stimulates to look for information outside their field of specialisation. Through cooperation with students of other majoring subjects and working on global issues and by using knowledge from different angles and clarifying values to each other, they develop a common language and technique for documenting and discussing.



Active learning throughout the project stimulates interaction and collaboration (Question 3).

Question 3: Opting for active methods of learning was a good choice, with the objectives in mind (experience-based learning, gaining insight into processes, network building, methodology of project work)

Consulting with others and learning from others are both mentioned. Students experienced that collaboration and interaction generate fresh ideas as well as necessary moral support for learning through action. They also practise the social skills that they will need in a professional context.

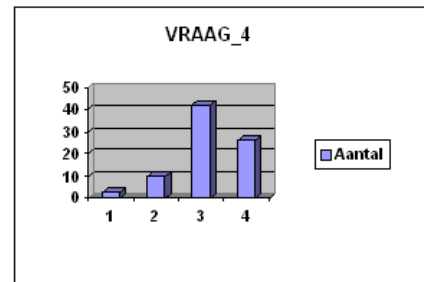


The project method exposes new dimensions of learning. Project working is a confrontation with one's own limitations and shortcomings. Students are confronted with a number of tasks they were not familiar with. At the start of the project students are confronted with diverse tasks they have to perform within their groups. A discussion forum on e-learning also resulted in a wide variety of opinions and ideas.

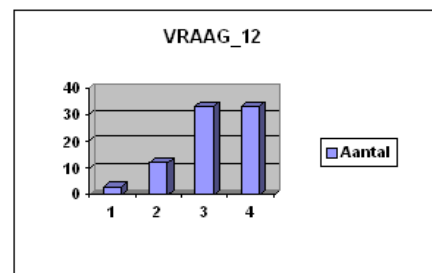
Consulting *different sources of information stimulates students* (questions 4-12). A closer look at the project papers shows us that students get information from the following sources:

- articles;
- contacts, interviews, company visits, official sources;
- courses;
- the Internet.

Question 4: I could get sufficient information by making contact with organisations outside and by doing research on the subject

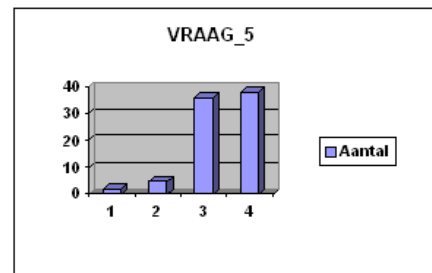


Question 12: I used e-learning on a regular base during the project

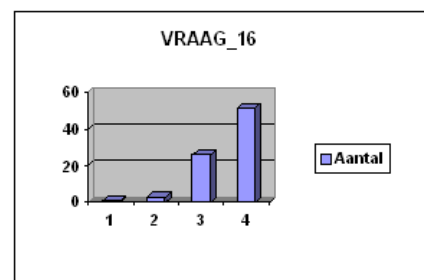


One of the strengths of the project is the adaptation of the case for pupils from secondary school (the information desk, website and workshops) (questions 5-16-17-18-19-20)

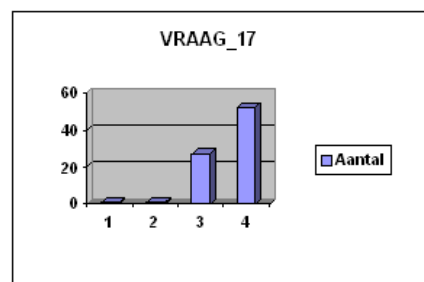
Question 5: I was able to translate the complexity of the chosen issue by setting up an information stall with educational and instructional materials for the visiting pupils



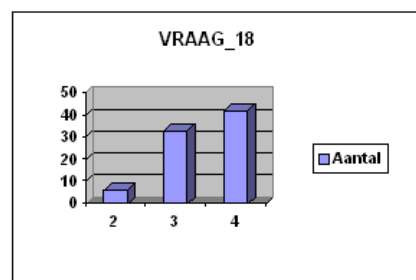
Question 16: Organizing workshops in the information stall for pupils during their visit was meaningful



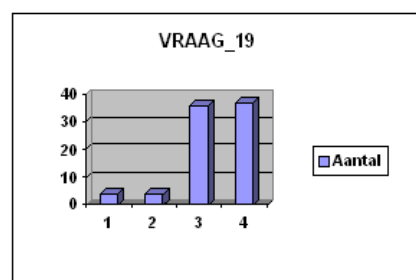
Question 17: Building the information stall was manageable



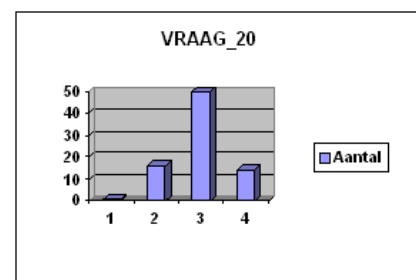
Question 18: *By doing all kinds of activities during the visit in the information stall I was able to motivate the pupils for our issue*



Question 19: *The visiting of the pupils from secondary schools went smoothly (by songs, signposting, etc.....)*



Question 20: *During my visit of all the information stalls (9) I discovered that every chosen issue is part of the umbrella theme*

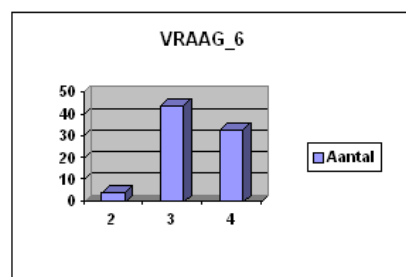


The project method exposes *new dimensions of the students capacities*. During project working we discover that students expose certain skills and attitudes that normally are neither recognized nor noticed during the common teaching practice.

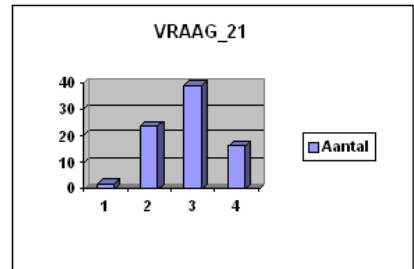
This gives us a clearer look on the capacities of the students.

The debate forces students to perform *an in depth study* of their issue (question 6-21-23).

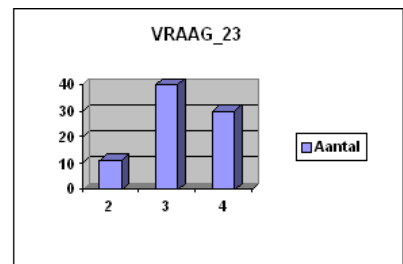
Question 6: *Defending a stand on the public debate forces me to do an in-depth study of the issue*



Question 21: Gathering information in the project portfolio helped me to define a stand concerning our issue for the public debate

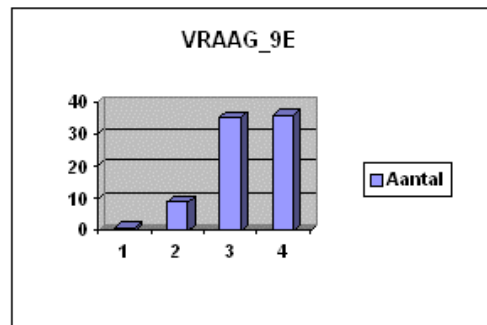
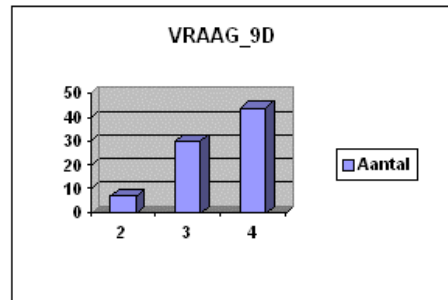
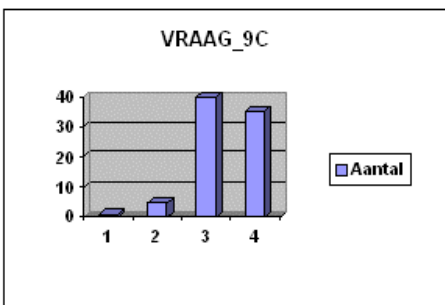
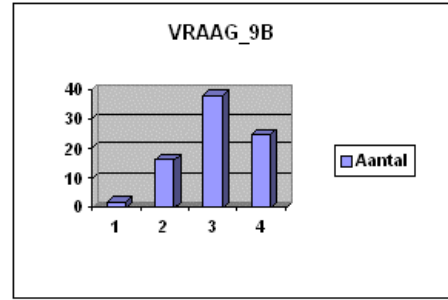
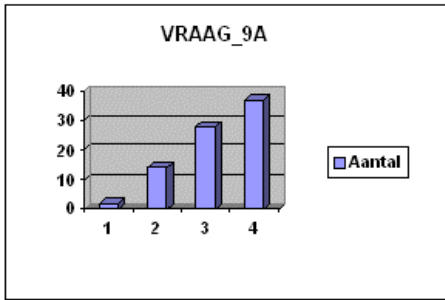


Question 23: During the debate I discovered that solutions to problems cannot be solved by one approach but need to be linked to all kinds of aspects within our society (and should be seen from different angles within society).



The coordination of the project by the steering group was appreciated by all the student-groups (question 9).

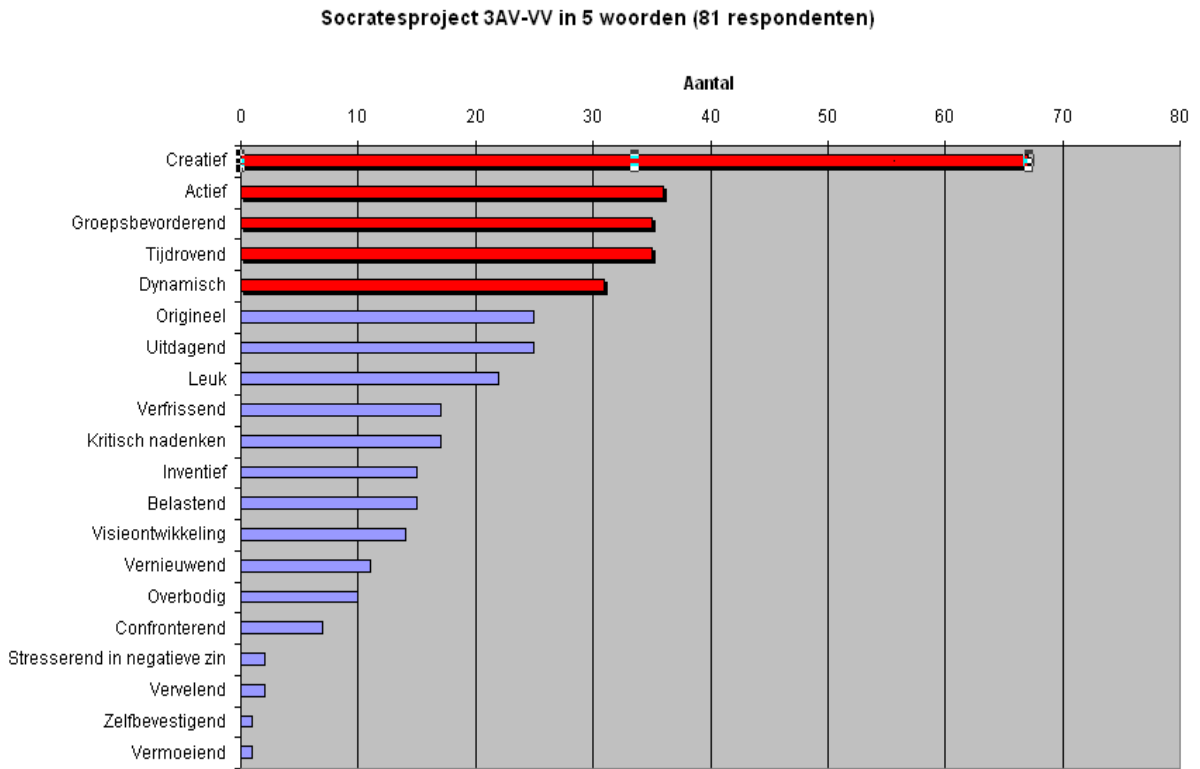
Question 9: the coordination of the project by the steering group was sufficient for: communication (9a), planning (9b), exchanging information (9c), use of e-learning (9d) and sensitisation (9e)



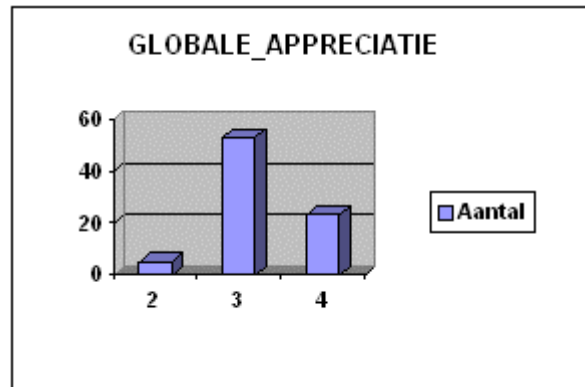
Question 31: Describe the project in 5 words:

The 5 words the students used for the most to describe the project were:

- Being creative.
- Stimulating co-operation.
- Time consuming.
- Active learning.
- Dynamic setting.



Global appreciation of the project:

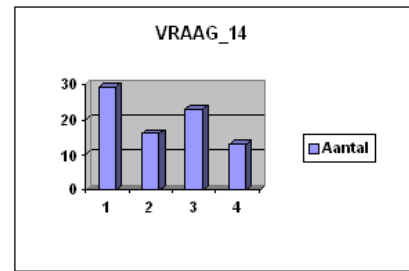


Limitations

We also discovered some limitations within the project such as:

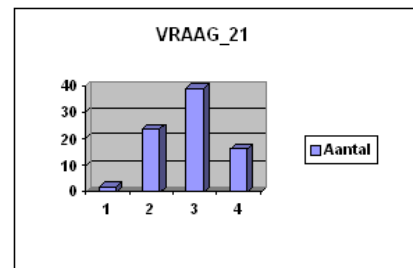
Problems with careful *planning and time management* (question 14)

Question 14: The spreading of the project over time was necessary (start in September, project day in April, project week in May)

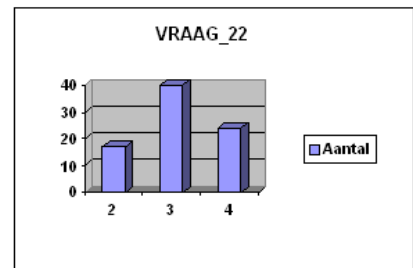


Formulating ideas in a clear way during the debate (question 21-22)

Question 21: Gathering information in the project portfolio helped me to define a stand concerning our issue for the public debate

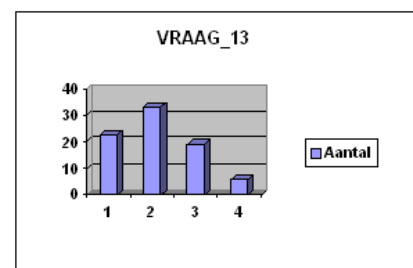


Question 22: Being part of a critical audience in the public debate was very instructive



The *guidance and support* by the teacher trainers in the different project groups was not a success in every group (question 13)

Question 13: The guidance by the lecturers during the project period had a surplus value



A limited amount of critical thinking on content (portfolio)

A limited amount of self-evaluation/self-reflection (portfolio)

What did we learn for future planning?

Because of the social orientation and the personal involvement (ownership) of the students in the choice of an umbrella theme, the guidance by fellow students (steering group), the defining of the different sub themes, the process and outcome will always be different. Each year we try to adjust and improve, this makes the whole setting *very dynamic and instructive* for both students and lecturers.

We want to improve:

- The *guidance* during the data processing stage: students experience difficulties with planning and time management. The guidance will be provided by one lecturer during the fourth semester. Students who want to start as soon as possible can attend a sensitization and information session at the start of the academic year.
- The *quality of the discussion forum*: we feel that many students hardly know the difference between chatting and a forum discussion. Students will get support from ICT and language teachers.
- The *feedback concerning the process and the product* towards students during and at the end of the project: this will be done on a regular basis by the responsible lecturer.
- The *quality of self reflection* by giving feedback on the profundity of the student's own role within the project
- The importance of the interdisciplinary work within the curriculum: active learning and project *working is now planned* within the whole programme of teacher training. That is why we implemented the subject called "School within society" in the common curriculum during the whole teacher training of all student teachers.
- The *coaching* by organising coaching seminars for 15 to 20 students.

It is important that students and lecturers feel involved and are motivated to work on the project. Therefore it is always a challenge to look for ways to get the project groups started. It requires an effort to get on the same wavelength as the students and to align with the students' way of life.

We feel that the whole project contributes to the *implementation of new ideas*. We noticed that, throughout the project life cycle, colleagues produced new ideas for implementing different methods and forms of assessment.

Materials used

- Questionnaires for semester 1 and 4
- Individual scores of semester 1 and 4
- Group scores of semester 1 and 4
- Peer assessments of semester 1 and 4
- Individual written reflections by the students
- Portfolio

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University College CVU-Vest, Denmark

Case study on ESD

Teacher education at Ribe Seminarium

Briand Bæklund and Birgitte Sperber

What is the relevant context?

Starting point

Søren Vinding is the Danish coordinator of the CSCT project. He asked for co-operation among his university college colleagues. Briand Bæklund and Birgitte Sperber responded positively and joined the project in summer 2005.



Institutional context

The University College CVU-Vest has several institutes situated on two campuses:

In Esbjerg, the pre-school education section has been involved in CSCT with Søren Vinding as teacher and initiator at different levels.

In Ribe, the initial teacher education section has been involved since the summer of 2005 with Briand Bæklund and Birgitte Sperber as teachers and initiators.

The teacher training college also offers further education courses for in-service teachers. As these courses are paid for, the college has an interest in offering a wide variety of courses to keep its teachers employed.

However, as the public system, public schools included, has limited funding the schools have problems affording training for their teachers.

This means that not all courses offered actually run.

Briand teaches the pedagogical, psychological, didactic and religious subjects.

Birgitte is a teacher in Geography (and former also Biology). Both of them are strongly committed to SD.

Wider contexts

The classes involved have been studying according to the teacher education regulations which prescribe four main subjects. From next year, this changes to three main subjects.

Completing teacher education qualifies the students for teaching in the public school from the first to the tenth year. The teacher students have compulsory subjects in pedagogical, psychological, didactic, creative, religious and social subjects.

In addition, they have four main subjects which are also subjects taught in schools, and the guidelines for teacher training in these subjects follow the school guidelines. However, the content of the subject has to be dealt with from a pedagogical and didactical angle.

Position in the curriculum

The main subjects are studied for 2 years each.

As SD is a part of the guidelines for Geography, we involved Birgitte's classes in the project. The class involved was the 2nd year of Geography class of 2005-2006. Because they were in their second year this meant that the students had acquired the basics of the geographical disciplines and were about to link everything together in a project involving regions and global problems and issues.

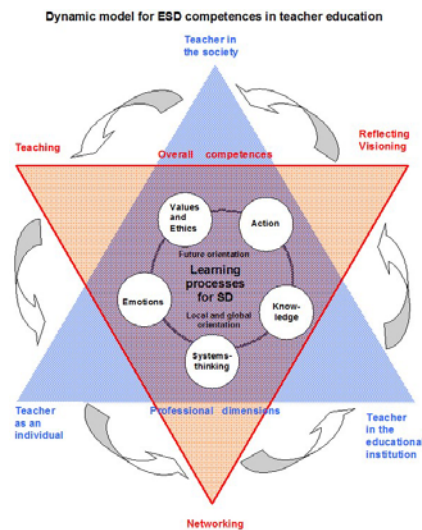
The second class involved in 2006-2008, however, were starting their first year of Geography.

What are the intentions of the initiative?

Related to competences

Our aim was to develop Competences for schoolteacher students and in-service teachers necessary for teaching ESD in pre-schools and in schools so that pupils could obtain the formative competences in SD as described in the Concept model below.

Concept Model produced at CSCT Meeting in Klagenfurt Oct. 2006



We agree with the statement: “A competence - holistic notion - is therefore not reducible to its cognitive dimension, and thus the terms competence and skill are not synonymous”¹¹

We consider the above mentioned competences as parts of a unity that the teacher students acquire during the learning and practice processes. The understanding of the competence concept will always have a subjective element depending on the learner's background (inspired by Vygotsky's culture historical school). Therefore, we did not divide our description of competences into the skills of the model. Instead, we have formulated the following aim for our work:

Aim for our work:

¹¹ RYCHEN, D.S. & SALGANIK, L.H. (Eds.), 2003, OECD. Key Competences for a Successful Life and a Well-Functioning Society. Hogrefe & Hüner, Göttingen

- 1) Empowering teacher students to acquire understanding of the concept of sustainable development.
- 2) Empowering teacher students to acquire such geographical and pedagogical ideas that they are able to plan and implement teaching in sustainable development.
- 3) Empowering teacher students to co-operate with supervisors in obtaining data and reflecting on their own ESD competence development process.
- 4) Through involving our teacher students in our action research we aimed at developing their particular competences as described in the Action Research Model below (p. 8) - in particular their own reflection on and description of the process.

What have we done?

We have worked at different levels in order to promote the idea of SD and ESD including the institutional level¹² and the inter-Nordic level¹³.

Related to content

As the CSCT programme was cross-institutional we had many discussion meetings and started a common study group on action research among ourselves - Søren Vinding, Briand Bæklund, Birgitte Sperber and Bjarne Rasmussen (who left the project later on).

Planning

We have been *planning at three levels*.

We planned a course in ESD for *in-service teachers*. This has been offered in 2007, but we do not yet know if it will run.

Together with the *teacher students* from two different classes, we decided and planned work on SD - combining the geographical, ethical and pedagogical disciplines.

We were supervising the planning of teacher student Kirsten Bloch when in her practice period she was teaching SD in a *year eight class* of the public school in co-operation with the *in-service teacher* of the class.

¹² Attachment F p.28

¹³ See Side effects page and Attachment G p.30

(Separately attached file¹⁴: Our observations described in words and pictures from the film shot during the final presentation).

(Attached file: Kirsten Bloch's report).

(Attached file: Kære Louise).

Teaching methods

We have decided to use the Action Research Model explained below.

We worked dialectically between theory and practice - between lectures by teacher, group work by students followed by school practice (if possible).

We used films at the college level, in the school level and as a tool for observation and learning during the process.

What did we actually do?

a) SD and ESD in Geography in teacher education

1) Autumn 2005

Theory activities

Birgitte's introduction to the concept of Sustainability.
(Attached file: ESD in Geography in teacher education).

Briand's introduction of a didactic model and design for project work.
(attached files: "Didactic reflections" and "Project Work").

Student's group work on ESD at lower secondary level - they worked on how to plan and teach different SD issues in Geography in the upper secondary level.

- Sustainable tourism in Fanø (a little island).
 - (Separately attached file: Essay example "Bæredygtig turisme").
- SD in general - planning of group work among students.
- SD in the use of the sea.
- SD from a consumer's point of view seen from a Supermarket.
- SD in general - planning and materialisation in year eight of Sønderriiskolen.

¹⁴ ESD at Sønderriiskolen in Esbjerg, seen in pictures.

Link to practice

Our design is the Practice level in the Action Research Model above.

Ideally, there should be a link between the essay and the experiences in teaching practice. That was only possible in the case of one student Kirsten, where we were involved in all phases (Action Research Model) of her practice level.

The reasons why only one student had the chance to try ESD in practice were.

- in most cases students entered schools which had already planned their curricula;
- our theory-tool phase was too close to the practice period.

2) Winter 2007

Theory activities

International conventions and ESD - teacher's obligations.

Ethics behind ESD.

The concept of Global Citizen as a pedagogical objective - the ethics of sustainability¹⁵.

Student's essays on ESD - application of ESD on geography:

- Recycling of aluminium cans (see PP in attached file and DVD).
- Denmark's energy policy (see PP in attached file and DVD).

b) ESD in a lower secondary class

Design

1. Teacher trainers teaching of theory and practical tools at the College.
2. Co-operation with the school where the practice occurred and the practice teacher Michael Damm Deurs.
3. Teacher student Kirsten Bloch's planning with supervision from us and the practice teacher.
4. Teacher student's implementation both alone and supervised.
5. Our observation and filming of parts of the project including the secondary school students' presentation and reports.

c) ESD in in-service teacher training

¹⁵ Peter KEMP: Verdenborgeren som pædagogisk ideal (2006)

Curriculum for an ESD course for in-service teachers (not yet run).
(Attached file: Implementation of ESD in public schools - A Course proposal).

How did we research the initiative? (Action Research)

As mentioned above we used the Action Research Model on the next page as a model for our work. The model is based on notes taken during a lecture by Steen Elsborg from Danish Pedagogical University.

The Action Research Model explained and used

1. Meta level

Our point of reference is our general theoretical background in education and sustainable development.

Based on our cognition (*Ontology*) and perception of existence (*Epistemology*) we believe that in co-operation with other humans pedagogical and political we can contribute to sustainable development and in that way make the world a better place to live.

2. Theory level

Concerning human's relations to the environment our *Paradigm* is that sustainable development is possible in most cases.

As teachers in teacher education, we have some *Hypotheses* concerning our opportunities of initiating a process, which may enable teacher students to develop the relevant competences in planning and practicing teaching in sustainable development.

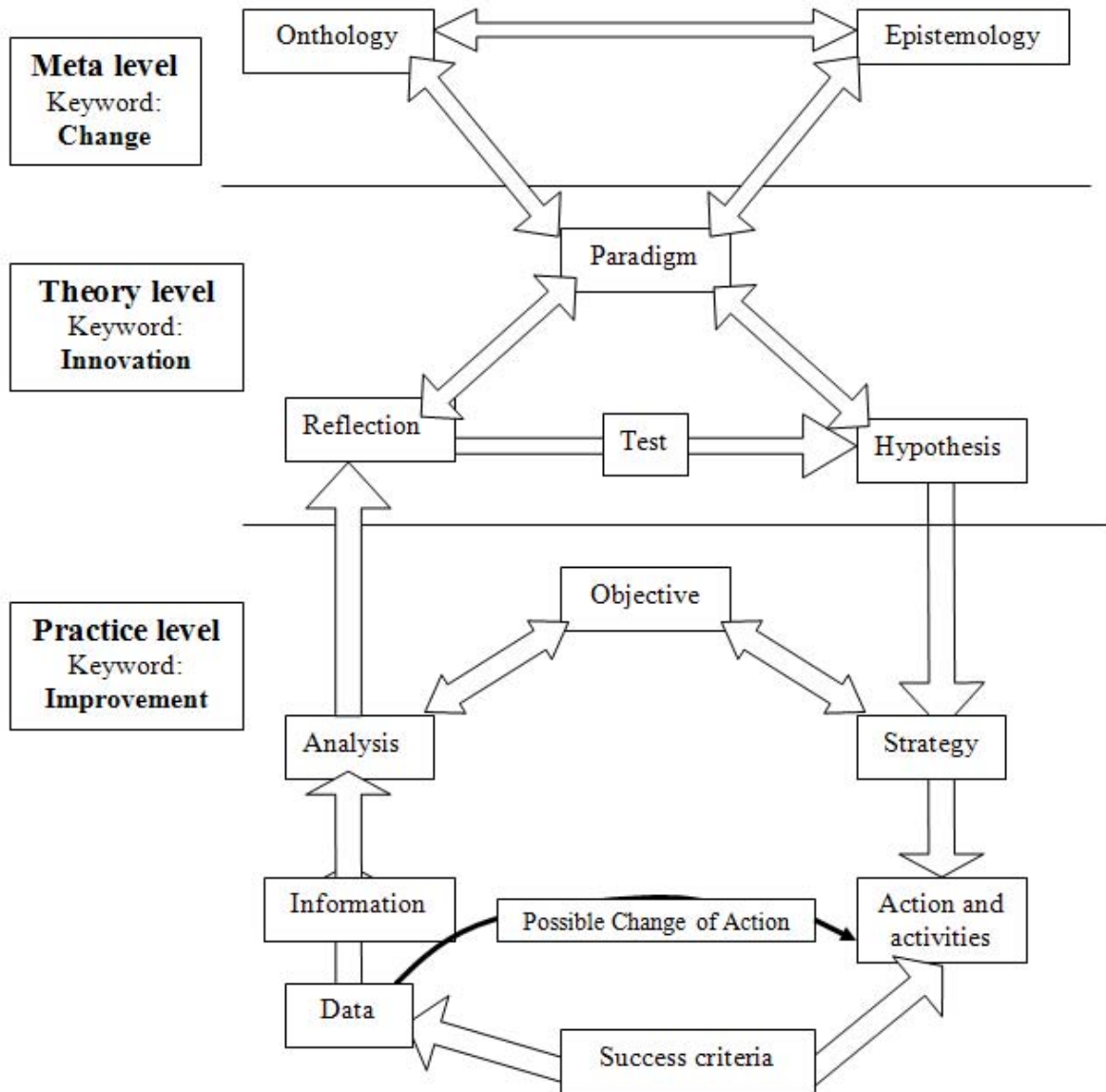
We want to test the following *hypotheses*:

Through our action research project we can develop the following competences:

- 1) Teacher students are able to acquire understanding of the concept of sustainable development.
- 2) Teacher students can acquire such geographical and pedagogical ideas that they are able to plan and implement teaching in sustainable development.
- 3) In their studies and practice, teacher students are able to co-operate with supervisors in obtaining data and reflecting on their own ESD competence development process.

Action Research Model

Based on notes from a lecture by Finn Elsborg from DPU.



3. Practice level

- a) We are working on sustainable development in a class of Geography teacher students. Our *Objective* is to enable the teacher students to teach sustainable development. Our *Strategy* in reaching this objective is:

- a) Giving the teacher students the necessary pedagogical tools and geographical knowledge concerning sustainable development.
- b) Letting the teacher students make a geographic-didactic project work resulting in a report on ESD preparing their later teaching.
- c) Enabling the students to implement their project intentions and pedagogical ideas in their period of school practice (if the schools accept it).
- d) Our function is to advise and observe the students as well during their project work as during their period of school practice.
- e) Based on *Data* and our observations from the evaluation of the project reports and from the student's teaching practice we will estimate the *Success Criteria* of the *Actions and Activities*.

b) Action and Activities

b), c) and d) are the chosen acts and activities. If the results are not satisfactory, it is possible to adjust the actions and activities accordingly making them more successful.

c) Information

The *Data* is conveyed to the students and discussed with them and the results of the entire process are conveyed to a wider audience through the ESCT programme. In our case study, our data are analyzed, discussed and evaluated in relation to the initial *Objective*. In that way the *practice level circle* is closed.

The *Data analysis* is reflected on the theoretical level too regarding the validity of our initial *Paradigm* and *Hypotheses*, regarding the position of geography and the applied pedagogical tools in teacher education. The *Reflection* also tests the validity of our *Hypotheses*. In this way the *Practice level* and the *Theory level* are interlinked.

If the validity of our *Paradigm* is contradicted by our own observations and reflection, our *Meta level* might change as well. So, on all three levels of the model are interlinked.

Test of our hypotheses:

- 1) Teacher students were able to acquire understanding of the concept of sustainable development. They proved this through their project reports on ESD.
- 2) Teacher students have acquired such geographical and pedagogical ideas that they became able to plan and implement teaching in sustainable development. This was proved through Kirsten Bloch's teaching in upper secondary school documented by her log and our observation in her class and our discussions with her practice teacher and herself.
- 3) In their studies and practice teacher students are able to co-operate with supervisors

in obtaining data and reflecting on their own ESD competence development process. From Kirsten's work and reflections and our observations it was obviously so.

Learning

On the *Practice level*, there is ordinary learning.

On the *Theory level*, there is “double-loop learning”:
Learning leading to a change of theory.

On the *Meta level*, there is “triple-loop learning”:
Learning leading to a change of cognition and perception of existence.

The model applied for SD and ESD in Geography in teacher education

We used this model in such a way that during our work in class we used all three levels. In the student's essays on ESD, we used the two lower levels.

The model applied for ESD in a lower secondary class

In the practice in public school, together with the student Kirsten Bloch and the pupils in the final evaluation, we used all three levels during the constant following and analysis of the teaching process.

This means Triple Loop Learning for the children (at least some of them).

The model applied for planning the course on ESD for in-service teachers

We intend that the in-service teachers and some of the children in their school will reach the Meta level.

Investigating film as a teaching material in ESD

We have experienced that film is:

- A good teaching material as a starting point and “subject opener” for the motivation of students.
- A way of presenting data, as some of the pupils did in Kirsten's practice.
- A mean of presenting other viewpoints and other places and problems in order to reach both theory level and meta level.

Description of empirical data

We received five ESD group essays from all the teacher students - of varied quality of course. We have attached the best one, on Sustainable Tourism on Fanø, as a separate file¹⁶ “Bæredygtig turisme”.

Only one student, Kirsten Bloch had the possibility for practicing ESD in public school in her practice period (the rest of the students entered already planned curricula).

She has made a summary, which we have translated and attached below¹⁷.

In addition, Kirsten Bloch produced a major report on her planning, her diary and her observations.

This report and our observations from our visits at the practice school proved that Kirsten reached the target because she had developed the relevant competences in planning and practicing teaching in sustainable development - the competences that were the aim for our work¹⁸.

The empirical data at the institutional level are shown in the attached letter to the director¹⁹.

Our planned course for in-service teachers²⁰ has had no enquiries so far.

The use of films

At ESD conference level: The film “Water in the Hindukush” made by Birgitte Sperber was shown at the conference in Fanø in 2005.

¹⁶ “Bæredygtig turisme” / Sustainable tourism.

¹⁷ Attachment D p.24: ESD in public school - by Kirsten Bloch.

¹⁸ See page 5.

¹⁹ Attachment F p.28: Proposals and ideas for implementation of ESD at institutional level - A letter for the principal at Ribe Seminarium by BB and BS.

²⁰ Attachment E p.25: Implementation of ESD in public schools - A course proposal for in-service teachers by B. Bæklund and B. Sperber.

At the pre-school teacher education level: Søren Vinding conducted a theme “The Feast in Social Sustainability”. Birgitte Sperber showed film and colour slides from the Hindukush putting the theme into a perspective.

At college level: In Geography, we use films for demonstrating other places and the problems we are dealing with.

At public school level:

- Kirsten showed films from Danish TV about EU’s agricultural policy and the third world.
- A group of her students produced a film for the presentation of their project on waste treatment. They used film for outlining two scenarios for the future - one with and one without sustainability.
- Birgitte recorded the process using a video. The video was afterwards screened for the class so that they could learn from seeing their own presentations. (Pictures from the video are used as the front page of this report.

The film Darwin’s Nightmare was shown during the introduction.

Notes from observations

Observation and supervision report on the practice period of teacher student Kirsten Bloch

A: During the first part of the work

Before our visit to the practice school Kirsten had informed Birgitte and me that she had started her project on SD. It was her impression that the starting phase was successful.

During her planning of the project, she had used the didactic *reflection model*²¹ along with the *guidelines for project work*²² that we had presented to the Geography class at the college and these didactical tools had worked satisfactory. Prior to the start Kirsten had collected comprehensive inter-disciplinary materials on SD with an emphasis on Geography.

The purpose of our visit was:

- observation of how Kirsten was dealing with the project;

²¹ Attachment B p.19.

²² Attachment C p.22.

- in order to advise Kirsten we also observed the work of the year eight students.

At first Birgitte and I had a meeting with the practice teacher and Kirsten in the teacher's room. At the meeting, Kirsten and the teacher updated us on how the project was running.

Then all of us entered the class where Kirsten introduced Birgitte and I before letting the groups continue their work (the students worked in groups on different issues of SD: Food production, global inequality, drinking water, transportation, garbage, energy and climate.)

The project groups were working in the classroom as well as in the computer room and in the library. The groups were working independently, the division of the work was good and the students were goal-oriented and committed. The groups worked on data collection, data processing and were about to start the writing of their reports.

The work and social behaviour of 1 or 2 students in the class, however, was not appropriate. It was mainly the class teacher, who dealt with these problems.

At the end of the days' work in plenum the groups presented their results and problems which led to a discussion of different issues in SD, such as how the students can act sustainable in their daily life -saving water, electricity and practicing re-cycling.

Birgitte asked about the possibilities of shooting a film during the final presentation.

The practice teacher promised to ask the parents and the school for permission.

The subsequent discussion with Kirsten had the following themes:

- Kirsten's clear commitment might have a negative impact on students who might feel unable to live up to her attitudes.
- The importance of making the students aware that SD is a positive future oriented way of viewing the world, and not a way of loading the heavy burdens of the world problems on to them.

B: At the end of the practice period

The practice teacher had obtained the permissions to shoot the students, so Birgitte was shooting during the events of the day.

The session consisted of two things:

- The students presented their results of their work on SD.
- A social game on attitudes to resources and consumption.

All the groups had completed and handled in their reports and now they were to present their results to their classmates, to Kirsten, to the practice teacher, and to Birgitte and me.

There was a natural spread in the level of the knowledge skills and in the ways the groups had chosen to present their results. There was a good atmosphere during the presentations and the students were happy and proud of their results. Among the presentations was a video film made by the students dealing with their subject Garbage. It was an excellent presentation. Several of the groups used wall sheets for their presentation. The sheets were good; however, they were not sufficiently clear during the presentation. We commented on that to Kirsten and to the students and they agreed to put up the wall sheets in an exposition so they would function better.

The game on attitudes to resources and consumption was very exciting and provoked lots of good discussion that challenged some of the attitudes of the students. There was a good, positive atmosphere during the game that opened up many comments and opinions. It was a well-chosen way of ending the long course of 30 lessons. The results of the game came to act as an attitudinal evaluation of the course. It was obvious that the students' attitudes to SD had been aroused and that they had acquired a good knowledge on the complexity of problems relating to SD.

Kirsten got lots of credit for her excellent work. She passed her practice test and has prospects on a position at the school later on.

Observer Briand Bæklund

Analysis of empirical data

Analysis in relation to the Action Research Model

a) SD and ESD in Geography in teacher education

We used the Action Research Model in such a way that during our work in class we used all three levels. In the student's essays on ESD, we used the two lower levels.

b) ESD in a lower secondary class

In the final evaluation of the practice, including the analysis of the teaching process in the public school which was conducted with the student Kirsten Bloch and the pupils, we decided that all three levels were used.

This means Triple Loop Learning for the children (at least some of them).

c) Curriculum for a course on ESD for in-service teachers

We intend for the in-service teachers and some of the children in their school to reach even the Meta level.

d) At the institutional level

We have not yet completed the circle at the practice level.

e) Networking

Involvement in the Danish Network for ESD organized by DPU, Denmark's Pedagogical University by Søren Breiting, Karsten Schnack et al.

Involvement in the Nordic Network for Environmental Education.

We are getting involved in research projects on ESD that are working on all three levels.

f) Investigating film as a teaching material in ESD

We have experienced that appropriate film material is

- A good teaching material as a starting point and "subject opener" for the motivation of students.
- A way of presenting data as some of the pupils did in Kirsten's practice.
- A mean of presenting other viewpoints and other places and problems in order to reach both theory level and Meta level.

Have we reached our goals?

As teachers in teacher education, we have some Hypotheses concerning our opportunities of initiating a process which may enable teacher students to develop the relevant competences in planning and practicing teaching in sustainable development.

- We have reached our goals at the teacher student level in class.
- The practice experiences were only possible at one school. The experiences were such (as Kirsten writes) that most of the pupils changed their ways of acting and thinking and that Kirsten herself wants to use ESD as an axis of her future as a teacher. From our discussions with her supervisor, we also got the impression that he was also inspired to continue in ESD.
- We hope for more opportunities in school practice when the new geography class go on their geography practice next autumn.
- We also hope for opportunities at the in-service teacher course which we hope will materialise next year.
- Concluding: The work and the collection of empirical data will continue even after the close of this project and the submission of this report.

What side effects have occurred?

- The result of using film in ESD is a positive side effect of the project.
- We got involved in the Nordic Network for Environmental Teachers in order to promote ESD and CSCT. The Nordic environmental teachers of course were mostly focused on ecology. We feel that we opened up a wider (socio-economic) understanding of SD to them. We may also have inspired the design of the future research programme. In Sweden and Finland ESD in an ecological sense seems to be more emphasised than in Denmark. Therefore, we gained lots of inspiration from meeting our Nordic colleagues.
- For the Nordic network we planned a conference meeting in Ribe that took place in October 2006:
 - Søren Vinding introduced his teaching ESD for pre-school education.
 - The Wadden Sea Area and the problems with SD here were introduced through an excursion and guided visit to the Wadden Sea Centre.
 - Mutual presentation of current project work including CSCT.
 - Research planning.

What did we get/learn for future planning

- We will continue to incorporate ESD in our teaching Geography (Birgitte) as well as in the Pedagogical and Ethical issues (Briand).
- We will continue to offer the course for in-service teachers.
- We will continue in the Nordic network for environmental teachers.
- We hope for continued network contact with the CSCT colleagues that we have come to appreciate highly.

Materials used

- Literature on Action Research and ESC used in our study group.
- Instructions on Didactics and Project Work by Briand Bæklund (attached)
- Instructions on the original concept of sustainability etc. by Birgitte Sperber (attached).
- Films from Danish TV and Birgitte Sperber.
- Instructions in essay writing by Briand Bæklund.
- Peter Kemp: "Verdensborgeren som pædagogisk ideal" (The global citizen as a pedagogical ideal) (2006) - the chapter on the ethics of sustainability.
- The ordinary literature used in the teacher education.
- Model for Action Research based on Finn Elsborg from DPU.

- The Concept (competence) Model developed at the CSCT meetings and completed at the Klagenfurt meeting.
- Internet.
- Excursion to Søren Vinding's sustainable house at Fanø.
- Visiting the practice school supervising Kirsten and her supervisor.
- Student's essays and Kirsten's big report.

Acknowledgements

We want to thank all our CSCT colleagues for inspiration. In particular we want to express our thanks to Peter Posch for his supervision and comments to the first draft of this report - comments that were very fruitful to us.

We also wish to thank Kirsten Bloch for her big work on ESD in practice. In particular, we want to thank her practice teacher Michael Damm van Deurs and the school Sønderrisskolen, Esbjerg for their positive attitude to the work and to our visits.

Attachments

Attachment A

ESD in Geography in teacher education.

Activities at the Danish teacher training college Ribe Seminarium.

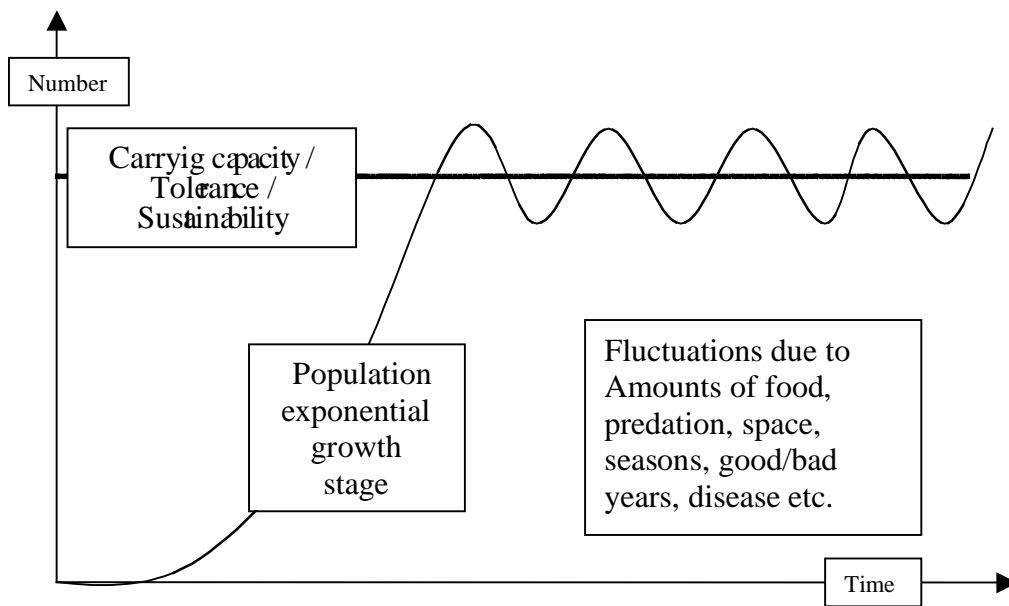
By Briand Bæklund and Birgitte Sperber.

ESD for student teachers in main subject Geography

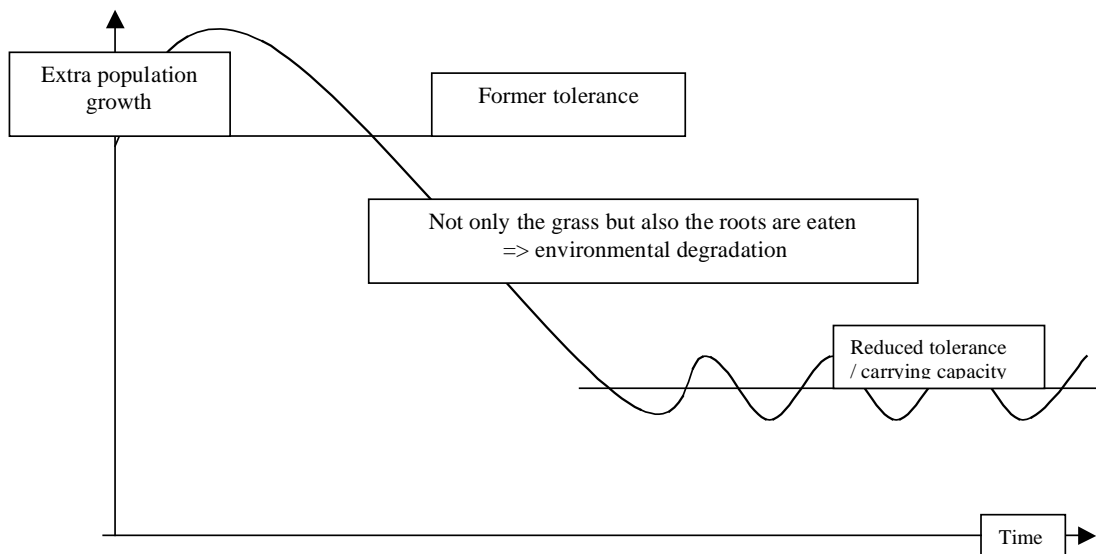
- The project and its methods introduced to the student teachers.
 - Action research as a useful tool for teachers.
 - Problem based learning:
 - Didactic reflections (attached power point).
 - Project work (attached power point).
- Baseline study: What do we associate with the words Sustainable / Sustainability?
 - Brainstorming among students:
 - Rainforest.
 - Fishery and agriculture.
 - Rio conference.
 - Global problems including population growth and hunger.
 - What children learn at school they take home to teach their parents.
- Competencies often mentioned in learning objectives. What is that?

- o Brainstorming:
 - Tools for solving problems.
 - Social competences.
 - Intercultural competences.
 - etc.
- Concept sustainability defined in its original sense from population biology through the following examples:

A couple of rabbits are released on an island



What happens if the predators are removed?



- This example => Introduction of the concept "over-grazing"
 - Do you know examples on this involving people?
 - Brainstorming:
 - ◆ Resources.
 - Exhaustible.
 - Renewable.
 - ◆ Environmental degradation.
 - Pollution.
 - Salination of irrigation channels.
 - Overpopulation.
 - ◆ Local / global angles.
- Is sustainability a matter of environment alone?
 - Are issues other than environment and people involved in the reasons behind problems and the solving of those problems?
 - Brainstorming:
 - ◆ Economy.
 - ◆ Politics.
 - ◆ Society.
 - ◆ Values.
 - ◆ Etc.
 - ◆ Ethics being the umbrella concept.
- Sustainability historically in the global discourse
 - Stockholm.
 - Brundtland.
 - Rio.
 - Agenda 21.
 - UN Decade for ESD.
- ESD as a better way of approaching the huge global problems that we introduce to pupils and that are often too big and serious to handle - sometimes so much that pupils say they do not want to have children in a world like this - a world already ruined by former generations.
 - ESD is future oriented.
 - ESD is creative and can be optimistic.
 - ESD is action oriented.
 - Individual actions have to be formulated as an outcome.
 - Communal actions - how to influence development inside a democratic society - good and bad ways.
- Big discussions about different issues and how sustainability is involved: Local issues and global issues - in particular how inequality is implied. (internet used i.e. www.gapminder.org and the teaching materials at www.undp.dk)
- As a compulsory work, all the students have to make geography-didactic curriculum plan.

The students have agreed to make it in sustainability in different fields of their own choice.

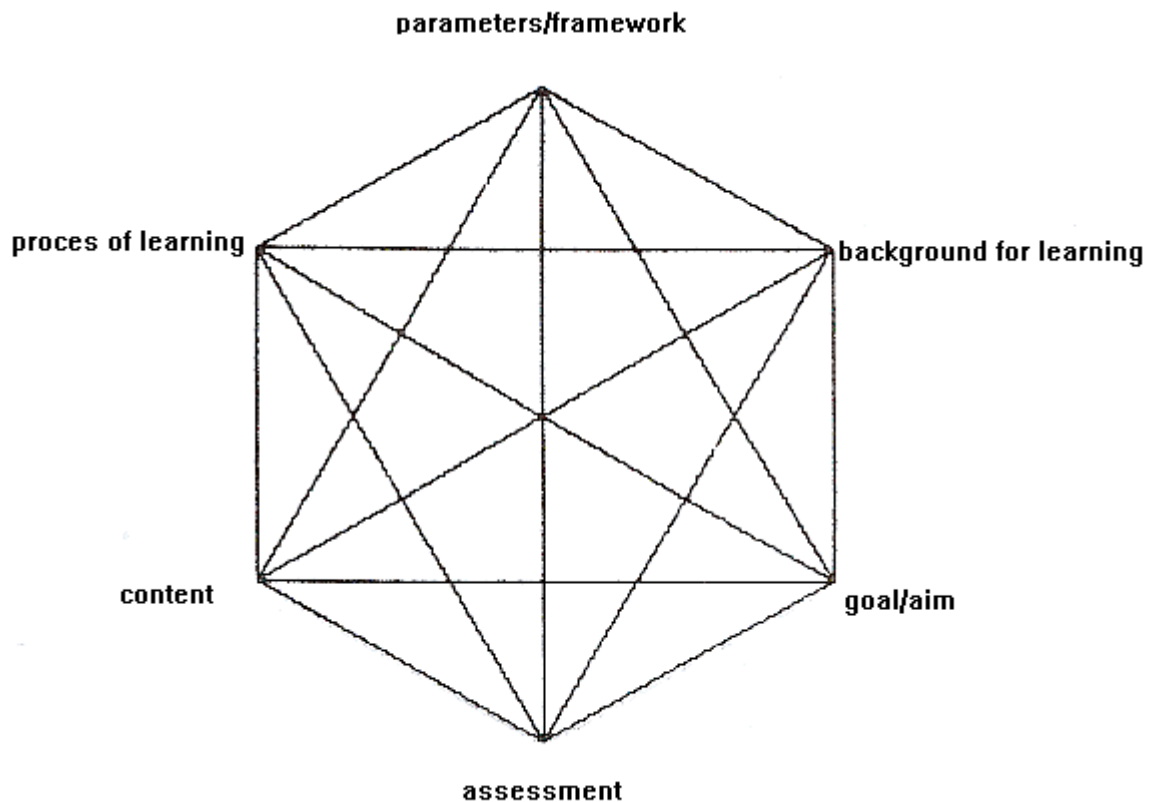
Attachment B

Didactic reflection.

(A power-point presentation).

Basic principles of curriculum and instruction.

Model of relations/holistic model



Background for learning

- Analyzing the pupils’ background for learning.
- Get a picture of the individual person’s mental, physical and social resources.
- Decide if there is a possibility of the pupils’ co-operating with the teacher in planning the process.

Goal/ aim

- What do we want to achieve?
- What do we want the pupils to learn?
- Where do we want to focus concerning.
- Knowledge.
- Skills.
- Positions/attitudes.

Content

- What is the teaching and learning about?
- Principles for choosing the content.
- Organization and progression.

Process of learning 1

- What does the teacher have to do?
- Choosing teaching principles:
 - Deductive.
 - Inductive.
 - Differentiation.

Process of learning 2

- What do the pupils have to do?
- Choosing working methods and tasks.
- Choosing organization form.
- What kind of experiences are the pupils supposed to get?

Parameters/framework

- Teaching and learning are encouraged or limited by parameters/framework e.g.:
 - Economy.
 - Time.
 - Equipments.
 - Environments.

Assessment

- Choosing the objects for assessment e.g. the teacher - the process of learning - the pupils.
- Choosing when to assess - during or after the process of learning.
- Choosing what the pupils' achievements are related to e.g. the goal/aims or the pupils' background for learning.
- Choosing assessment methods.

Attachment C

Project work.

A pattern for a pedagogical working method.

Finding a topic

- The teacher and the pupils use discussion to agree on a topic and everybody collect materials about the topic. These materials are used to create an intention, an interest and knowledge about the topic. This provides the basis which is necessary for formulating the problems.

Formulation of problems

- The teacher must support the pupils working on the formulation of problems. Formulating the problems determines the project work.
- To make sure that the end result is as good as it can be then problems can be reformulated during this process.

Planning of investigations

- Project work is often group work. The group choose what they want to investigate and decide who is doing what.
- The teacher is a supervisor.

Carrying out the planned work

- The pupils are doing their own experiments.
- The groups are learning from each other in class meetings, where they discuss their problems and their results.
- The teacher has to support the groups in finding a well-qualified presentation.

Presentation of the groups' results

- Timetable for the groups' presentations.
- Framework of time for a presentation.
- Class discussion of the groups' results.
- Distribution of materials and reports between the groups in the project work.

Conclusion and assessment

- The formulation of problems - has it been illuminated sufficiently?
- What do we know now?
- Do we have to do something else?
- How did we succeed professionally and methodically?
- What do we need to learn to make it better?

Model of relations and project work

- The structure of project work can be added to the structure in the model of relations in two ways:
 - The project work can follow the structure in the model of relations.
 - The structure of the project work can be placed in the category: the process of learning in the model of relations.

Attachment D

Student essay writing on ESD in Geography at lower secondary level

Didactic essays

As a compulsory part of their Geography studies, the students have to write a didactic essay on Geography teaching. The students agreed to write this essay on SD or ESD in different areas of Geography.

Framework

We had the following demands:

App. 10 pages.

The subject should be relevant for Geography.

The essay should contain:

- Problem formulation.
- A detailed teaching pack for a lower secondary class.
- Systematic didactic reflections.
- The environmental/geographical subject matter.
- Conclusion.

The best of the essays “Bæredygtig turisme” is attached separately.

The next class presented essays on ESD in Power Point.

Two examples are attached separately:

- “Recycling of aluminium cans.”
- “Denmark’s energy policy.”

Attachment E

ESD in public school - Report by Kirsten Bloch.

Planned Curriculum for Geography in year eight at Sønderriiskolen, Esbjerg.

ESD at Sønderriiskolen, Esbjerg seen in pictures (captured frames from video by Birgitte Sperber)



Sønderriiskolen in Esbjerg, Denmark



Michael Damm van Deurs, class teacher for year eight and practice teacher for



Teacher student
Kirsten Bloch



Global inequality group presents for their classmates in 8B.



Applause after every presentation.



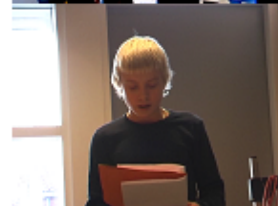
Food production group



Teacher college teacher
Briand Bæklund
observes the process

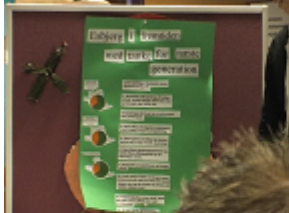


Drinking water Group



Transportation group

Garbage group presenting different future scenarios with and without recycling



using posters and self produced video

Student Parliament



Group work on bills for Sustainable Development



Session leader



Voting



Speaker

Concluding session: Consumer's game



Over-consumption
Consumption
Basic Needs



Different items to choose among



What are the important needs?

Food? Mobile phone?

Background for learning

My knowledge about the pupils is limited, as I have not yet met with them.

I have been informed that it is a clever year eight class with 22 well-motivated pupils.

My knowledge of year eight students in general has made me anticipate problems during the process, as the subject SD is far from easy. Hopefully these problems will be overcome.

Parameters / framework

I have 30 lessons at my disposal, which should make good and extensive work possible.

As the concept of SD is probably unknown to the pupils and not dealt with in standard teaching materials, I have obtained the following materials to illustrate the subject SD.

The travelling exhibition “My Earth” from NOAH.

The booklets “My Earth”, “Ecological Backpack”, “Pandora’s lunch box”, “Food to think about”.

Materials from Max Havelaar Foundation (Sustainable production and trade).

Video films.

Furthermore, I obtained different books and addresses on relevant homepages with further information.

I have found the materials beforehand as I consider it more important to work on the subject than to search for materials about it.

During the entire project period, the class and I have the school’s big computer-room at our disposal. This is a big advantage, as the pupils will have to search a lot for information on the internet.

Concerning my own background as a teacher, I consider my age (51) and experience an advantage.

My limited teaching experience, however, is a disadvantage.

Goal / Aim

After finishing the project work, the students will have the following competences:

- Knowledge about Agenda 21½.

- Deep knowledge and opinions about an SD subject of their own choice.
- Knowledge and opinions about other SD subjects.
- Increased competences in arguing for a cause.
- Increased competences in co-operation.
- Increased competences in project work and presentation.
- Increased action competences in SD - “What can I do myself?”

During my presentation to the students, I will do my best to challenge the pupils. I will do so by using examples from the actual world situation. My aim is to motivate the pupils for the project work. Once young people are confronted with the global imbalances, they feel challenged wanting to know more. That is the right engine for project work.

I have chosen the subjects in such a way that they represent areas that will lead to conflicting conclusions among the groups. My aim is to induce conflicting points of view for the role game at the end enabling the students to take their different positions.

Content

The headline of the project is “Sustainable Development”.

I chose the following themes for the groups:

- Energy.
- Water.
- Food.
- Industries.
- Transportation.
- Fishing.
- Wastes.

All themes are illuminated in different ways during the initial presentation.

I intend to let the students choose which theme to work on.

Process of learning

I have chosen project work as a method for two reasons:

- It is a good way of going deeply into a subject.
- It is an important way of increasing the pupils’ competences in this method.

During the entire work, the pupils have to keep a log, as a well-kept log will be a great help for the pupils for the work on their final report and when arguing and discussing during the role game.

I intend the project to result in a common class report on Sustainable Development.

Without knowing the choices of the pupils, the intention of the role game is that the pupils after discussion should reach a common conclusion.

Assessment

I will evaluate and reflect on the process throughout to ensure that all groups are on track.

In the end, I will evaluate the pupils' reports, presentations and the role game.

Afterwards I will have a discussion with the students to learn their opinions about the process.

Then I will make a final assessment of the entire project - was my presentation sufficient, did the project work function, were my aims reached, did the role game work etc.

Evaluation just after the completion of ESD in year eight class

I have reached my aims. Today most of the pupils ask themselves: "How can I make a difference?" which was the essential point for me.

Through ESD, the pupils increased their knowledge about sustainable development in general. Inside their chosen subject, they reached the recognition that they are not just children without influence. They have responsibility and influence and can make a difference - It was just wonderful.

However, there are things that I would like to do differently some other time. I feel I used too much time on teaching project work because I did it early. The project work itself went well.

The outcome of the role game was not as I intended.

I expected the students to make a little presentation of each of the six themes and take stand on each of them. They were not able to do it, so I had to let them present only the themes in which they were the "experts". This "devaluated" the role game a little because the pupils did not had to take a view on themes they did not know a lot about. The problem was that there was not sufficient time for all the students to investigate all the issues.

I was pleased to see, from the two questionnaires completed by the students, that the expectations I had were reasonably accurate.

Reflections 6 months later

In my evaluation just after the teaching process, I concluded that the aims had been reached.

Now 6 months later, however, I think that we could have reached further.

I have asked myself how I could plan my teaching in such a way that the aims are reached progressively from year seven to nine.

I have no doubts that ideally SD must be integrated in all possible contexts in Geography.

Although a teacher chooses to use SD as the main thread in the teaching, there will be constant limitations due to the low priorities of the subject in the present structure of the public school. The government aims at increasing students' scientific qualifications, however, it is far from ready to supply the necessary resources.

My conclusion is that I will integrate SD in all possible contexts in Geography:

In co-operation with my colleagues I also hope to be able to initiate inter-disciplinary projects at all three class levels aimed at increasing the pupils' competences in their subjects, in argumentation, co-operation, project work and presentation obtaining a parallel and progressive process of personal development.

In my view, this will give the best results given the resources available to a teacher in Geography.

Kirsten Bloch

Attachment F

Implementation of ESD in public schools - a Course proposal.

Further education for in-service teachers.

ESD - new teacher competences and teaching ESD in public school

Duration: 70 lessons - 30 in autumn as a presentation, 20 for supervision during practice and 20 in spring for discussion and evaluation of the practice at every school.

Starting date: primo 2006-09-01.

End: Ultimo April 2007.

Time: 2pm - 5pm same day of the week.

Place: Ribe Seminarium and in-service teacher's own school.

Teachers: Briand Bæklund (religion, didactics and pedagogy), Birgitte Sperber (geography, biology), Connie Greffel (home economics) and others.

Target group: In-service teachers in science, home economics, social science subjects and religion.

Objective: Developing new teacher competences to plan and practice teaching in SD related subjects.

Content

Background: 2005-2010 is the UN decade for ESD. Therefore, the schools have to integrate and focus on sustainable development - now in a wider understanding than simply a focus on the environment, as it must also include economics, politics, ethics, values etc. as important components of sustainable development.

The future oriented and action oriented aspects of SD are a good pedagogic approach for pupils, who find it hard to encompass the huge global problems they inherit from previous generations.

The detailed content of the course will be inter-disciplinary knowledge involving the different subjects, pedagogical terms, methods and practices. There will be inter-disciplinary curriculum planning of teaching packs with equal emphasis on knowledge and attitudes.

The content of the participants' curricula will be local and global issues, for example environmental, and the uncovering of factors influencing development (political, ethical, economic, social conditions etc.), and how to deal with the problems now and in the future, locally and in the global community, along with other citizens of the world.

The issues will be decided by the course objectives and the needs and actual situation of the teachers.

Course plan:

	Number of lessons	Content
Part I	30 lessons	Didactic and subject related qualifying of participants for ESD

Part II	20 lessons	Participant's teaching at own schools supervised by course teachers
Part III	20 lessons	Discussion and assessment - participants present, discuss and evaluate their different teaching practices in SD Evaluation of course

Briand Bæklund and Birgitte Sperber

Attachment G

Proposals and ideas for implementation of ESD at institutional level.

A letter to the director of Ribe Seminarium.

23.5.2006.

Dear Louise

In your response to our application on a continuation of our development project "Education and Sustainable Development in initial teacher education" you ask for comments on how the project group is going to cope with less funding for the study year 2006-2007.

Due to these financial circumstances, the project group will have to cut down on our activities that so far have been extensive very productive. We will concentrate on what we have undertaken to do:

- Completion and writing of our case study "Implementation of ESD in initial teacher education".
- Development of a toolkit for action research.
- Translation of the CSCT project into Danish and adaptation of it to Danish conditions...

In your response you refer to the meeting between us, with the director's board suggesting that we continue working on a common course for in-service teachers and trainee teachers on ESD. Your colleague suggested involvement of our practice schools with this course.

At our institutions, there is no tradition for such common courses. Therefore, we need a precise framework for such courses and some instruction on how they would be implemented.

We suggest the following course proposals:

- In-service teacher course.
- Afternoon meetings for all teachers at the practice schools.
- Course for practice teachers (directly involved in the training of our students).
- Information on ESD for all practice schools and practice training institutions.
- E-learning course for developing the in-service science teachers' teaching on ESD.
- A course on sustainability in the working environment (involving also the social dimension of SD).

We can develop these courses in a given framework on the premise that sufficient resources are provided.

During the meeting, we were given the task of describing a common ESD module for teachers and trainee teachers.

We suggest the following for such a project:

- Practice teachers and trainee teachers alike carry out a project related to ESD
- This project should be done in the second study year when the direction of their future profession is being established.
- It should integrate the practice periods.
- It should aim at developing competences concerning.
 - Project work.
 - Interdisciplinary work.
 - ESD.
- Teacher students and pre-school teachers can be together in the introductory phase.
- Teacher students and pre-school teachers can give each other response on the presentation and assessment phases.
- Teacher students and pre-school teachers can work separately during the rest of the project advised by their own subject teachers.

A content of a common ESD module could be as suggested above. The ideas outlined should be adapted to the given framework when/if ever materialised. We are not developing more on this issue before given the green light by the direction.

In the project group, we agree upon the importance of the establishment of a VUBU - a knowledge centre for ESD on our University College CVU-Vest. WE have learned at SDU, the University of Southern Denmark work is going on to establish knowledge centre on issues related to SD. These are:

- Centre for tourism, innovation and culture (TIC).
- Institute for environment and business economics (IME).
- Institute for research and development of rural areas (IFUL) - (quite new).

We suggest that concerning the development of VUBU should be done in co-operation with SDU. We suggest the direction to take contact and outline the framework for a future co-operation.

The first of phase of such a co-operation should be mutual information, inspiration and discussion about our perceptions of SD.

Second phase of such a co-operation could aim at establishing the VUBU - knowledge centre for Education for Sustainable Development.

On behalf on the project group.

With best regards.

Briand

Attachment H (Presentation at a meeting for the Nordic Network in October 2005)

PROJECT ACTIVITIES SO FAR

Theory of Action Research

- Study group of the project participants.
 - Papers studied and discussed.
 - Papers delegated and presented.

Activities at the teacher training college Ribe Seminarium

by Briand Bæklund and Birgitte Sperber

Case 1: ESD for student teachers in main subject Geography

- The project and its methods introduced to the student teachers.
 - Action research as a useful tool for teachers.
 - Problem based learning.
- Baseline study: What do we associate with the words Sustainable / Sustainability?
 - Brainstorming among students:
 - Rainforest.
 - Fishery and agriculture.
 - Rio conference.
 - Global problems including population growth and hunger.
 - What children learn at school they take home to teach their parents.
- Competencies often mentioned in learning objectives. What is that?
 - Brainstorming:
 - Tools for solving problems.

- Social competences.
- Intercultural competences.
- etc.
- Concept sustainability defined in its original sense from population biology through the following examples:

A couple of rabbits are released on an island. What happens if the predators are removed?
(See graphs in attachment 1)

- This example => Introduction of the concept “over-grazing”
 - Do you know examples on this involving people?
 - Brainstorming:
 - ◆ Resources.
 - Exhaustible.
 - Renewable.
 - ◆ Environmental degradation.
 - Pollution.
 - Salination of irrigation channels.
 - Overpopulation.
 - ◆ Local / global angles.
- Is sustainability a matter of environment alone?
 - Are other issues than environment and people involved in the reasons behind and the solving of the problems?
 - Brainstorming:
 - Economy.
 - Politics.
 - Society.
 - Values.
 - Etc.
 - Overarching them all Ethics.
- Sustainability historically in the global discourse
 - Stockholm.
 - Brundtland.
 - Rio.
 - Agenda 21.
 - UN Decade for ESD.
- ESD as a better way of approaching the huge global problems that we introduce to pupils and that are often too big and serious to handle - sometimes so much that pupils say they do not want to have children in a world like this - a world already ruined by former generations.
 - ESD is future oriented.
 - ESD is creative and can be optimistic.
 - ESD is action oriented.

- Individual actions have to be formulated as an outcome.
- Communal actions - how to influence development inside a democratic society - good and bad ways.
- Big discussions about different issues and how sustainability is involved: Local issues and global issues - in particular how inequality is implied. (internet used i.e. www.gapminder.org and the teaching materials at www.undp.dk).
- As a compulsory work, all the students have to make a geography-didactic curriculum planning.
The students have agreed to make it in sustainability in different fields of their own choice.
- In the next Geography class 2006-2008 Sustainability is going to be one of the axes.

Case 2: ESD in teaching practice at lower secondary level

- For most of the students, their teaching practice was already planned by the practice schools. However, Kirsten Bloch who is very motivated for the subject has convinced her practice school to let her make a project on sustainability with an eighth class. She has 30 lessons and free hands. We are following and advising her work closely.
- Methodology of project work.
- Teaching materials: Discussion also of the big amount of materials that Kirsten has found from internet, official authorities and grass root organizations.
 - Framework.
 - Project work schedule.

Motivation through presentation of facts (provocation).

Groups work on sustainability.

Role-play.

Evaluation by pupils.

Kirsten's goals for her project on SD at lower secondary level.

- Knowledge about Agenda 21.
- Deep knowledge and attitudes to the field of pupil's own choice.
- Knowledge and attitudes to fields of other groups.
- Increased competences in arguing for a case.
- Increased competences in co-operation.
- Increased competences in project work and presentation.
- Increased operative competence: "What can I do about it?"

Evaluation: Kirsten, Practice school and Briand Baeklund (BB)/Birgitte Sperber (BS).

Case 3: ESD course for in-service teachers in 2006-7

Planning and implementation (if sufficient applicants) of interdisciplinary course at Ribe Seminarium.

Till now drafted and accepted by the course administration.

- Didactics and pedagogy (BB).
- Ethics (BB).
- Environment (BS).
- Local / Global issues (BS).
- Society issues (BS).
- Household economics.
- Energy.
- Arts (making logo - awareness raising activity).
- Other?

Networking

- **Nordic Network of environmental education teachers**
 In October, Birgitte took part in the meeting in Härnösand about sustainable development.
 She presented CSCT and the work the Danes have been doing so far.
 General impression of the network:
 Big experience and high creativity and innovative spirit.
 The network is interested in contact to our project.
 The participants were most interested in the wider concept of ESD than an environmental concept.
 Sweden and Finland (Norwegians were not present) have come far in ESD in schools (Sweden has SD in school development programmes at a national level) and universities (compulsory subject at many studies).
- **Namibia / Ibis**
 Søren has been at a conference and the group had meeting with Namibian delegates.
 The school as a motor in sustainable development.

Birgitte Sperber

Study Programme Sustainability

A Way to Impart Competencies for Handling Sustainability?

Matthias Barth, Jasmin Godemann & Anne Busch

Initial Situation

Academic education is to be understood as a reflection of societal and historic processes, which are the basis for analysing and enhancing the development and shaping of society (Fischer/ Michelsen 2000: 168). Due to the inescapable questions of globalism and sustainability, academic institutions are facing the difficult challenge of re-adjusting their targets and objectives. Academia needs to include specialised expert knowledge in problem-oriented, systemic and integrated processes and approaches, not only in research but also in teaching. For this purpose, academia first needs to create the necessary interdisciplinary research and teaching structures. Students need to be familiarised with the changeability of complex systems in order to be able to adequately perceive and understand society and its developments.

Since - according to a constructivist view - such competencies cannot be “drummed into” the students, it is necessary to develop appropriate study contents and study forms which may facilitate such learning processes and promote the required competencies.

In this context, the concept of sustainable development is not only a challenge, but provides an orientation framework for creating teaching contents. As problems of non-sustainable development exceed the boundaries of scientific disciplines, the integration of sustainability content into academic teaching raises the need to effect an interdisciplinary re-structuring of formerly disciplinary course contents and to create new contextual gateways (Petschel-Held et al. 2001: 51).

In addition, dealing with questions of sustainability in higher education introduces not only the principle of interdisciplinarity, but several other important aspects, among them complexity, process characteristics and the handling of uncertainties.

In consideration of these new tasks, the Institute for Environmental and Sustainability Communication at the University of Lüneburg set up a three-year research and development project - “Sustainable University” (www.uni-lueneburg.de/sustuni). Innovative concepts in teaching and research within the University as well as for the work place were developed and proven in six sub-projects, where one focused explicitly on the question of interdisciplinarity in teaching and learning. Within the institutional framework, students are able to study in an interdisciplinary manner within the Study Programme Sustainability. For teachers it provides the chance to teach in a problem-oriented and co-

operative way in the field of sustainability. The project aims at promoting interdisciplinary and systems-thinking competencies for both students and teachers.

Target Dimension: acquiring (shaping) competence

In the discussion about educational processes for sustainable development, it is often stated that the didactic design of learning and teaching processes should be directed more towards acquiring key competences. Therefore, at the start of the development of the content and methods of the study programme, the focus is on formulating these competences.

The focus of the Study Programme 'Sustainability' is therefore to promote 'Gestaltungskompetenz' or 'shaping competence' in order to provide for an active, reflective and co-operative participation in the obligation to shape sustainable development. It primarily focuses on the handling of complexity, interdisciplinary problem-solving and self-dependent and self-directed learning.

'Gestaltungskompetenz' – 'Shaping Competence'

The term *competency* is not only discussed in the working context or in connection with questions of education. For some time, it has already been discussed in personal and societal every-day life. But in order to obtain relevance for practice, the concept of (key) competencies always requires a normative definition of aims. Competencies do not exist per se, but in connection with a certain desired output. The educational concept of education for sustainable development provides such a normative framework. Education for sustainable development specifically involves the acquisition of a number of sub-competencies subsumed under the term 'Gestaltungskompetenz', which can be translated as 'shaping competence' (de Haan 2006: 22). This objective allows for the constructivist ideal that individuals may only acquire competencies by autonomous action in their own life-world. On the other hand it points out that the request for sustainability may only be realised by the active shaping of competent citizens. 'Gestaltungskompetenz' means *"having the skills, competencies and knowledge to enact changes in economic, ecological and social behaviour without such changes always being merely a reaction to pre-existing problems."* (de Haan 2006: 22). Thus, the concept of 'Gestaltungskompetenz' is particularly characterised by such key competencies as enable a forward-looking and self-dependent active involvement in the shaping of sustainable development. Special attention is paid to the fact that sustainable development implies the necessity of modernisation measures. In the framework of the study programme, the acquisition of 'Gestaltungskompetenz' is facilitated implicitly as well as explicitly. Explicitly, relevant skills and sub-competencies are practiced via different methods and processes. Implicitly, the acquisition of competency is enhanced by interdisciplinary organisation, the handling of complex, multi-perspective problems and self-organised working procedures.

The study programme 'Sustainability' is focussed in the first place on the following aspects of competences: dealing with complexity, interdisciplinary problem solving, self-dependent and self-directed learning and personality development.

Handling of Complexity

The context of sustainability reveals problems with complex characteristics that may not be managed via a simple cause-and-effect approach. Rather, sustainable problem-solving is about thinking in problem nets, something that is contrary to the prevalent thinking tradition.

"The tendency to mono-causal thinking in effect chains, instead of effect networks, is not compatible with the necessity to think in networks. When humans encounter a deplorable state of affairs, they look for means of remedy. These means are generally valued only in terms of their suitability to remedy this present state of affairs and only seldom in terms of their other effects, even when those may possibly cause even more deplorable states of affairs than those which are presently meant to be eliminated." (Dörner et al. 1983: 23).

This way of thinking is emphasised during the Study Programme Sustainability and thus complements the thinking promoted in the individual disciplines.

Interdisciplinary Problem Solving

In order to do justice to the integrative character of the concept of sustainability and at the same time produce knowledge applicable in the social context, the Study Programme Sustainability focuses on the interdisciplinary acquisition of topics. This relates to the composition of the student group as well as to the choice of lecturers.

This leads to a very complex way of working on and solving problems, which lies outside the classical discipline-organised procedure. One discipline alone cannot provide the answer to the problem of sustainability. It is true that we need to know the basic scientific principles of an environmental problem in order to give a precise description. However, this knowledge is not enough to solve the problem, since the causes of the problem do not relate to natural sciences. They are anthropogenic, that is, they are caused by human action. Thus, the whole area of social science becomes significant.

Beside the claim for interdisciplinarity, we find the criterion of transdisciplinarity. Through co-operation between representatives of different disciplines and representatives of economic and social practice, scientific and action-relevant knowledge is put on the same level.

Self-dependent, Self-directed Learning

The third important feature of the study programme is the active structuring of the learning process from the very beginning by the students themselves. This strengthens personal responsibility. Self-management relates to learning processes as well as to the choice of adequate methods, the handling of information and the concrete treatment of the given topic in terms of content. The study programme promotes the principle of self-direction with the help of two different, complementary approaches.

First, during the time on campus and the project work, there is a step-by-step progression from guided to self-directed learning. This offers the possibility to try and apply personal responsibility and self-management. Even inexperienced students are offered a higher degree of autonomy during the learning process. The project work is ultimately the sole responsibility of the student and may be understood as a serious trial of self-management.

The parallel use of a learning platform enables learning independent from time and space, as happens within the groups. The ever strengthening integration of the learning platform into the learning process leads to an even more pronounced role for the student. This allows for the fact that successful self-managed learning is first of all dependent on competencies, or personality traits. These traits may not be influenced directly, but an individual learning strategy may be adjusted to take account of them.

Personality Development

Finally, the aspect of personality development is not to be understood as a separate characteristic but rather as a consolidated one. The study programme's objective is to foster the interdisciplinary competencies of the students via certain methods and topics, and to facilitate the acquisition of abilities useful in life. Modern society and its problems require members who are able to handle complex situations, act reflectively, and make decisions: people who are able to take responsibility, who integrate their ethics with their actions, and who have insight into the consequences.

“It is the duty of science, research and teaching to regard the development of personality at University as an academic commitment, and to exercise it.” (Spoun/ Wunderlich 2005: 20). The Study Programme Sustainability aims to put knowledge from different disciplines into certain correlations and contexts, draw conclusions and to derive responsible actions from this. Finally, the study programme's objective is to contribute to the student's personality development.

The Study Programme Sustainability takes up the challenges sketched above and works to promote students' interdisciplinary and systems-thinking competency. That is, to create an awareness of the possibilities and limits, the methods and approaches of their own discipline, and to communicate with people from outside their subject in a way that enables the development of joint solutions. Alongside the contextual debate involving complex, sustainability related questions, the objective is to lead controversial discussions, solve conflicts, agree on compromises and develop common and realistic solutions.

The Study Program Sustainability takes into account the fact that knowledge cannot simply be transferred but must be generated and built in concrete situations and against the background of the participants' own experiences. For teachers this implies that enabling processes of self-directed acquirement of knowledge and providing terms and conditions for self-directed learning become a necessity.

Within the international discourse on education for sustainable development the necessity of innovative didactical approaches is being emphasised repeatedly. Pilot projects all over the world are set up in order to give life to new teaching and learning arrangements, exploring innovative ways of meeting the challenges of sustainability. Regarding the desired competence of interdisciplinary problem solving, there need to be developed new learning and teaching tools, targeted to support interdisciplinary reflection and the handling of complexity.

A trans-disciplinary case study involving co-operative project work is usually considered as an appropriate instrument to facilitate a self directed, problem oriented and co-operative learning process. At the same time, however, it is about challenging the complexity of unsustainable problem fields and connecting constructive competences to the focus of analyzing problems. In order to avoid ambitious, but diffuse action, it is useful to choose a method which facilitates a reduction of problem structures to the essential arguments, in order to identify suitable content-related aspects for project work that is oriented towards sustainability. In order to remain action competent, the learner should be allowed to experience complex connections and encouraged to reduce them to the essential cause-effect pattern even though this will involve them with uncertainties and complexity.

Construction of the Study programme

The inter-disciplinary study programme on sustainability will be offered as an elective study programme to all University students from the 3rd semester on. Over the time period of two semesters, the study programme offers approximately 30 students *der Erziehungs-, Kultur-, Umwelt- und Wirtschaftswissenschaften* the possibility to identify social problems and global trends involving politics, economics, culture and social matters in an

interdisciplinary dialogue. Heterogeneous groups develop solutions that are based on an interdisciplinary approach and exchange. Expert scientists from different disciplines of the University as well as external experts from the field of practical application co-operate in the subject-spanning study programme.

The study program consists of a workload of 750 hours, spread over five modules. Face to face and e-learning activities alternate and they constantly refer to each other.

Blended learning

A multimedia-based learning environment seems to be particularly suited to self-directed, explorative learning, and it offers (e.g. via the internet) a wide range of networking and participation possibilities. Therefore the study programme is offered as a blended-learning course alternating between attendance and e-learning phases. The learning platform promotes and enhances learning in the classroom-based phases in many ways. On the one hand, the development of a computer-based learning environment fosters the ability to deal with the topic independently of other persons, time and place. Furthermore, computer-based learning opens up a series of possibilities for individual learning processes since it enables adequate illustration and working opportunities with versatile interactions and interdependencies.

As a „Wiki“, based on Mediawiki, a php-mysql-based open source software will be used, which is also used in Wikipedia, the best known Wiki. Besides the Wiki as a central location of knowledge management, background material can be downloaded from the learning platform, and on a mediacenter documents can be uploaded. For more detailed discussions appropriate fora are available (Barth, 2006).

The use of a wiki-system as an open, co-operative author-system promotes a collaborative knowledge-management approach. The equal creative freedom of the many users facilitates participative elements during the generation of knowledge from the very outset. The illustration of complex sustainability topics with different interdependencies and cross-references may be realised by a sequential knowledge desegregation into many single web pages that are closely linked with each other (Barth 2005: 270).

The joint work on the contents and the many mutual cross-connections form the basis for active collaborative knowledge.

The study programmes conclude with concrete project work, which is the student's responsibility and which is produced in small groups by the students. From the winter semester 2004/05 through to the Summer semester of 2005, the issue of food, agriculture and consumption was dealt with as „Besser essen - nur eine Frage von Produktion und Konsum“? (eating better - only a matter of production and consumption?)

The approach chosen for the learning process within the study programme in Lüneburg may be broken down into six phases, as shown in figure 1:

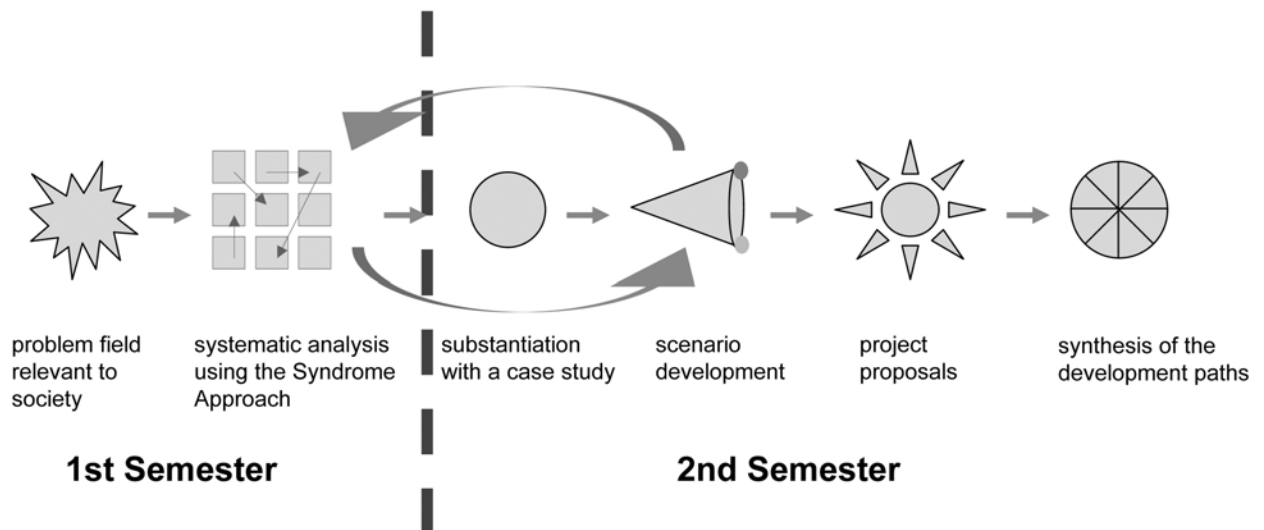


Figure 1: Systematic approach of the study programme

Selection of a problem field relevant to society

The starting point of the trans-disciplinary case study is a genuine problem statement that is worked out in collaboration with researchers and practitioners. In order to find answers to today's most relevant challenges of sustainable development, the study programme is directed towards the global problem areas defined by the German Advisory Council on Global Change. The selection of an issue which has particular relevance to the life world of the participants is presupposed. For example, the study programme of the summer and winter semester 2006/07 was called: "*Urbane Räume - blühende Stadtlandschaften?*" ("urban space - flowering city landscapes"?). This question put the focus on the so-called Suburb syndrome, which describes the process of the expansion of cities which then has significant impact on the environment (Cassel-Gintz/ Harenberg 2002: 51).

Systematic analysis using the syndrome approach

As one tool for integrated research, the German Advisory Council on Global Change has suggested the so-called *Syndrome Concept* (WBGU 1997). The term *syndrome* in this context refers to functional patterns of human-nature interactions, or more precisely, negatively valued constellations relating human activities and environmental changes. The

approach is based upon a model of the inter-relationships between sections of the natural and human spheres and of important trends or symptoms which contribute to the aggravation or amelioration of certain states (for an overview see Lüdeke et al. 2004).

The Syndrome Concept, as it aims at identifying core-symptoms of non-sustainable human-nature interactions, is also expected to serve as tool for handling complexity in pedagogical contexts. In Germany, it has already been proven successfully in the school context (Cassel-Gintz & Harenberg 2002). Because there are no examples from schools of higher education available, the study programme on sustainability investigated the extent to which the Syndrome approach could be used to deal in a inter-disciplinary way with complexity, uncertainty and contradiction in higher education.

In the study programme the whole system, which is focused on each time, is broken down in separate system components, which are connected to each other in graphs which illustrate the interaction between them. The network of relations which is shown in this way provides an overview of the fundamental causes and mechanisms of the particular syndrome. This is illustrated in fig. 2 for the Suburb syndrome.

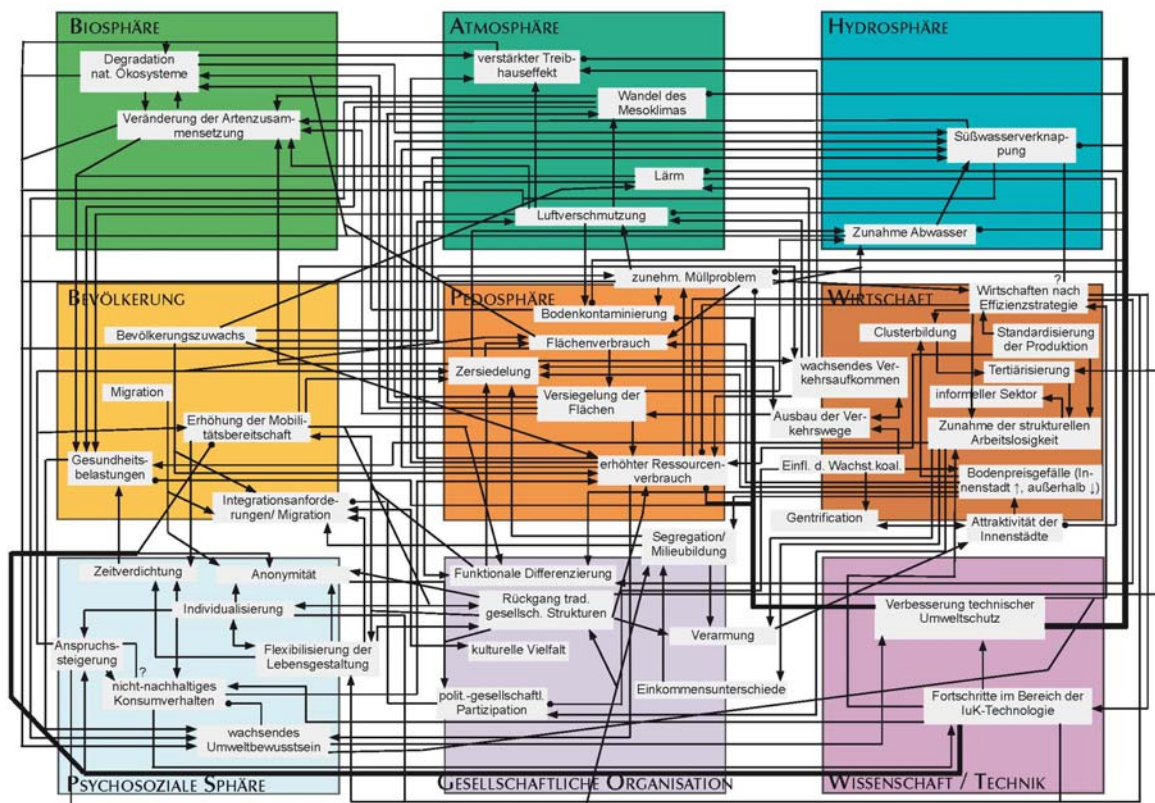


Figure 2: A Graph representing the network of relationships in the Suburb syndrome study programme 2006/07

The elaboration of the network of relationships originates in the self-directed learning process of the students, who can use both the learning platform and collective workshops and discussions with experts. This stage ends with the definition of a 'core syndrome' - the identification of the most relevant connection for the problem field investigated. This reduction of the very complicated initial network to the significant aspects provides a first indication about possible starting points for promising project work for the students.

Substantiation with a case study

A specific case field is selected, in order to make the elaborated network of relations concrete and to connect it to the life experiences of students. With the help of local experts, the theoretically elaborated relations are examined by using concrete data and facts in the case field.

This participative aspect widens the view of the students on the problem and makes it possible to work out practical solutions. For example, the Suburb syndrome is made concrete by using the city of Hamburg and relevant aspects of unsustainable city development are identified (such as increasing use of space and functional differentiation of living and working).

Scenario development

Widening the perspective by including the time dimension is a constitutive element of debates on sustainable development. Future scenarios such as those in the report 'Our common future' (Hauff, 1987) or 'Global 2000' (Council on Environment Quality, 1980) are starting points for reflecting on unsustainable lifestyles. Also focussing attention on the consequences our current actions have for the quality of life of future generations is a significant feature of a reflection process on sustainable development. By using these learning processes, the common development of different problem oriented future scenarios can strengthen these perspectives. At the same time the identification of relevant aspects can be used for the start of target oriented project work.

Based on this deeper understanding of the case and its specific characteristics, the next step is to develop possible scenarios and desirable development paths. For this, the influencing factors identified via the syndrome analysis are reviewed with respect to future development. Development of the scenario requires both creativity and a well-founded estimation of future developments. Any formulation of a positive or negative scenario is based on the previously created interdisciplinary knowledge base. That is, the extensive gathering of the students' knowledge is taken into consideration at this stage of work.

Project proposals

After the students have developed possible development paths and identified desirable positive scenarios, the next task is to formulate concrete projects that contribute to progress towards the positive scenario by aiming at and influencing the core parameters. This promotes a scientifically well-founded and thought-out procedure that strengthens students' action competency. In addition, the openness of the projects and their precise conceptualisation utilises the students' creativity.

Synthesis

Imbedding the chosen problem into the syndrome analysis demonstrates its networking and complexity. In addition, it becomes apparent that we must aim at the core point of a Syndrome in order to influence its development. The students' projects need to bear the characteristics of such "set screws" and be embedded in the Syndrome as a whole.

Some Answers and Many Questions

The Study Programme Sustainability was originally designed as an additional option for all students of the University of Lüneburg. As such it was tested, externally evaluated, and revised regarding methods and contents in a first trial.

The study programme in its new version was offered for the first time during the Winter and Summer terms of 2004/ 2005. Various data were collected during these terms which were then included in further development. The existing experiences as well as empirical data show to what extent the stated objectives (handling of complexity, interdisciplinary problem-solving, and self-dependent and self-directed learning) were achieved by means of the chosen methods. While many questions might have been answered in this manner, there is also a clear need for further research.

Thus, a framework for interdisciplinary learning with a focus on sustainable development was successfully created. The Syndrome Approach in particular proved to be an appropriate instrument for analysing complex problems and the interactions involved. Its presentation as blended learning met expectations as a successful way to promote self-directed collaborative learning.

The next step is to analyse in more detail to what extent the acquisition of such competencies is promoted by providing an online learning platform. In addition, it is currently being considered how to ensure broader effects for the programme and for its transferability. This involves the question of how such a study programme may be integrated into the curricula of the different courses, and how this model of Higher Education for Sustainable Development is to be made transferable to other universities.

At the same one should take care when evaluating to maintain an optimal balance between self-directed learning and directional instruction by the leader of the seminar. Within the framework of both projects in the study program, it became more and more evident that the self-directed learning and teaching processes presented problems because they were not part of the methodological repertoire of either the learners or the teachers. For example, teachers were requested not to interfere in the group discussions - but the discussion were then experienced by students both as wearing and as lacking structure. These learning processes, however, can still be very beneficial, especially when dealing with uncertainties and the contradictions in such learning processes. In the future criteria for self directed learning should be developed and should be integrated into the development of programmes.

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Hungarian case study

Revision of the "ENVIRONMENT AND SOCIETY" IN-SERVICE TEACHER TRAINING course in
Hungary

Interdisciplinary and multi-disciplinary based distance learning course

(revision of the previous course developed/piloted by 4 national HE Institutes, coordinator
Debrecen University, Distance Learning Center)

Eva Csobod

Background information

The Environmental and Society distance learning course is designed as a postgraduate teacher training course, mainly for teachers, in the form of distance learning in order to give freedom of studying with the obstacles of time and space.

There were several higher education institutes involved in the course development between 1999-2000:

- 1) Debrecen University, Faculty of Science, Department of Applied Ecology - co-ordinator of the course development.
- 2) Debrecen University, Faculty of Teacher Education.
- 3) Debrecen University, Distance Learning Centre - co-ordinator of the pilot course.
- 4) Agriculture University, Debrecen, Faculty of Informatics and Faculty of Economics.
- 5) Szeged University, Faculty of Law.
- 6) Teacher Education College, Eger.
- 7) Coordination Office for Higher Education, MoE, Budapest.

Course aim

The main aim of the Environment and Society distance learning course is to improve and develop the following knowledge, skills and competences concerning environment and society issues:

Student should be able:

- *to understand the complexity* of the environment and society from the point of view of ecological thinking, philosophy and practice and they should be able to *form their own opinion and link it to education*;
- *to plan the form of EE/ESD* in and outside of the school *with colleagues*. Students have to be *capable of organising programs* and co-operate in educational material writing;
- *to react critically* to environmental and society issues and present these in their teaching;
- *to analyse* the role of the media, environmental law and management and the role of NGOs;
- *to be aware* of global environmental processes and problems and to be able to think globally and act locally and link this to educational goals;
- *to utilize the results of EE/ESD researches*, new methods and apply those in daily work.

Structure of the course

The course consists of 9 modules. One module study time is 3 months (120 hours including practical work).

1 module: Social and environmental science relations of environmental elements and processes

The module gives an overview of the principles of ecology and environmental sciences. It introduces natural, built and social environments, and the history and development of environmental protection. The module provides learning conditions for natural and social systems and the concept of sustainable development.

2 module: Relations between environment and society, theories, perspectives

The students can learn about the concepts and philosophies influencing environmental and ecological thinking. It introduces the main theories of science history, tendencies, Gaiian hypotheses, ecocentric and anthropocentric environmental views.

It deals with the development and the main components of the social environment, its main components, pollution and prevention, the effect of globalization on the transformation of the social environment.

3 module: EE/ESD in formal and informal education, community and adult educational program

It is important to introduce and analyse the forms of environmental education/ESD during this module. This module deals with philosophy, policy and curriculum management, in harmony with the national curriculum (and aims to change it).

The module gives an overview on EE/ESD, it clarifies the role and place of learning and within it the relations between individuals and the social environment. It deals with the connections between vocational training and employment policy and the relation of unemployment, economy and society.

4 module: Legal approximation of environment and social control

The module introduces the subject of environmental law, its concepts and its relation to other sectors of the law. It introduces the National Environmental Protection Programme (and National SD Strategy) and regulations for environmental elements. It is important for teachers to know different permission processes, the concept and practice of environmental assessment. Besides the regulations the module deals with the role of NGOs in the society and its relations to education/EE/ESD. It introduces the history of NGOs, their roles in the society today and their connection to government and politics.

5 module: Environmental economics and environmental informatics

This module analyses the effect of economic aspects of environmental pollution. It introduces the environmental regulations on economic activities and different types of environmental policies. It gives an overview on the EU Directives on the environment. It discusses current methods in environmental economics, risk assessment, crisis management, environmental impact assessment and life-cycle analysis.

6 module: Role of the media in EE/ESD

The mass communication, the media is an important part of modern culture. This module introduces the media, through the Hungarian media situation, the role of communication and its responsibility in those questions that have effect on the environment and society. This module evaluates the role of NGOs in the media and in environmental debates. It helps the students with case studies to become active and critical participants of society. They can obtain information from the media and be able to build this into their teaching practice.

7 module: Global environmental and social issues, the role of local and global factors

This module illustrates the function of the Earth's global system and the living world, the importance of positive and negative feedback. It discusses the differences in attitudes to the environment of North/South, East/West. It deals with the reasons for global climate change, ozone depletion, desertification, acidification, population increase and its relation to the environment.

8 module: Sustainable development and education

Sustainable development is a recurring topic during the course. This development involves looking at the kind of progressive changes of both economy and society that will be required to produce an education that reflects the principles of SD. This module develops skills and competences for participation in change, reflection on processes, acceptance of alternative visions and tools for the implementation of concepts and visions.

9 module: Effectiveness of research in education, tools, methods. Dissertation writing

What strategies are relevant in educational research, particularly in EE/ESD? The students need to learn research strategies and methods which are appropriate to their dissertation writing. The dissertation topic should be connected to the daily work of the students, the relevant study of the modules and innovative research questions in EE/ESD.

Who can study the Environment and Society course?

Teachers from different backgrounds (natural sciences, humanities) and specialists who have a university degree can study the course.

The pilot course was implemented in 2000-2001 with 20 students studying at the Debrecen University. The evaluation of the course shows the success. One key result was that the students were able to write environmental educational materials for their schools after their study.

The new initiative

In 2004/5, a *revision of the Environment and Society course* was discussed and a new revised course better fitting the needs of Education for Sustainable Development was created. The revision took one year and then the dynamic model for ESD competences was integrated into the new course. The new course ran for the first time in the academic year 2006/7. The new course used the Szentendre 2005 model: Cluster for developing competences for ESD (Hucase_Annex1).

The aim of the revision of the Environment and Society course

- To support the personal development of the students studying the course.
- Students attending the distance learning course would be equipped to act as reflective contributors to curriculum development in their own institutions and would develop the ability to implement strategic actions in wider educational connections.

The revision of the course with some specific competence development of teachers was connected to the UN Decade of Education for Sustainable Development (2005-2014) and to the outcome of the previous research on teachers' professional development (Csobod, 2003).

The ESD competences in teacher education

Concepts for ESD competences in teacher education in the new course are based on the concept developed by the Comenius 2 CSCT project. In this concept education in schools needs to prepare young people for their future professional life and to build up the capacity of the young citizens to contribute to society in a constructive way. (Hopefully a sustainable society.)

The model of ESD competences in teacher education is attached in Annex1.

From this model the new course focuses on the development of reflection, system thinking and critical thinking of the teachers and students. The present case study supports the thinking process and action orientation clusters of the dynamic model.

Reflection, system thinking and critical thinking

The descriptions about reflection, system thinking and critical thinking were developed by the Comenius 2 CSCT project partners.

Reflection

Reflection is a *formal process* that allows teachers and students to look back to the teaching process of ESD.

- Teachers should understand *reflection as an integral part of the learning process* and motivate students for reflective learning.
- Teachers should be able to *reflect* on their role in the classroom, in the school with their colleagues, in the community, whilst also reflecting on global issues when doing ESD.
- Teachers should be able to *plan, organize and promote collective reflection* aimed at evaluating and making decisions leading to change

Systems thinking

- Teachers should be able to create conditions for *systems thinking* in the classroom, in the school and in the community.
- Teachers should be able to consider *different systems* as natural and be aware of the interrelations between the social sciences, the environment and economics.
- Teachers should be able to frame local problems as a part of a *larger context*.
- Teachers should be able to recognize, accept, and promote the use of strategies to deal with *uncertainty* in the classroom, working with other teachers and in the community.
- Teachers should be able to look at *multiple causes and effects* when they explore and participate in social situations.

Critical thinking

- Teachers should be able to create conditions for *critical thinking* in the classroom, in the school, and in the community.
- Teachers should be able to help the community to uncover the *power relationships* behind social situations.
- Teachers should be able to create conditions for *questioning assumptions* and recognize bias in different social situations.
- Teachers should be able to recognize, to accept and to deal with *different cultural approaches* brought into social situations by the students, other school teachers, and the community.

Creativity is connected to the three concepts, it means that teachers should be able to create the conditions that will promote creativity in the classroom, in the school and in the community so that new solutions emerge.

The revised course structure

The revised course has three revised modules from the original course curriculum and has integrated the CSCT competence model into the new modules, as described below:

Module 1: Social and environmental science relations of environmental elements and processes

The module gives an overview of the principles of ecology and environmental sciences. It introduces the natural, built and social environment and the history and development of environmental protection. The module provides learning conditions for natural and social systems and the concept of sustainable development. *In this learning process reflection, critical and system thinking competences can be developed on a more individual level.*

Module 3: EE/ESD in formal and informal education, community and adult educational programmes

It is important to introduce and analyse the forms of environmental education/ESD during this module. This module deals with philosophy, policy and curriculum management, in harmony with the national curriculum (and aims to change it).

The module gives an overview on EE/ESD, it clarifies the role and place of learning and within it the relations between individuals and social environment. It deals with connection between vocational training and employment policy, the relation of unemployment, economy and society. *In this module teachers can learn about how to improve reflection, critical and system thinking in the educational situation.*

Module 8: Sustainable development and education

Sustainable development is a recurring topic during the course. This development involves looking at the kind of progressive changes of both economy and society that will be required to produce an education that reflects the principles of SD. *This module develops skills and competences for participation in change, reflection on processes, acceptance of alternative visions, tools for the implementation of concepts and visions not only in education but also in society.*

The revised course study

The study time for the revised course is 1 year, distance study of 3 modules combined with 3 day school/ local training at the Debrecen University.

The assessment of the students contains 3 practical pieces of course work and 3 essays on the modules. The main requirement is the dissertation on EE/ESD in the school.

The course resources are: Course books (study guide, readings), websites, additional books on EE/ESD, innovative methods, team work, curriculum planning and integration.

Postgraduate Certificate: If the teacher is successful they are awarded a Postgraduate certificate in EE/ESD.

Implementation and evaluation of the revised Environment and Society course

The implementation of the revised course took place at the Debrecen University with 20 pilot students from September 2006 till June 2007. The evaluation of the new course was based on the practical course work and the essays of the pilot students combined with interviews.

The evaluation of the competence development of the pilot teachers on reflection, critical thinking, system thinking and possible actions in the future, was based on their assessment and individual interviews. 10 teachers were interviewed.

Interview question 1: What is your role as a teacher in the development of the school in environmental education, ESD, curriculum development and the necessary changes to be carried out in the school in general?

The answers of the teachers are listed:

- to develop the environmental education/ESD curriculum, to change the thinking of colleagues and put into practice new teaching methods with those colleagues;
- to shape the attitudes of the teachers and involve them more in the actual work in the field of environmental education;
- to work together with colleagues and make changes through team work;
- to co-ordinate environmental education/ESD programs and to make a good school work plan during the year;
- improving the school's environment in both a practical and an abstract sense and to make changes that will introduce greater democracy so that things will be more manageable in the school;
- to act as a catalyst in the development of the children and involve more colleagues in environmental education/ESD;
- organising exhibitions and different activities in order to make environmental education/ESD more attractive for others and thus bring about change;
- to change the behaviour of the children through different activities such as collecting batteries and involve more colleagues in environmental education curriculum in the school.

Analysing the answers I see three tendencies, the first group of teachers refer to the necessity change in the school curriculum, the importance of the improvement of democracy within schools and their influence in changing the social behaviour of the children. The second group felt that team work between school teachers is an important element in school development. The third group of teachers expressed the view that teachers should act as catalysts in the development of the school for both children and their colleagues.

The answers of the teachers are connected to undertaking an innovative role, co-operative work, as well as the role of catalyst in programmes in EE/ESD. From the answers the connections on curriculum change between teachers and the school board on the one hand, and ideas and action plans on the other, are not identifiable.

Interview question 2: What are the aspects of teaching which are successful in promoting learning and action for sustainability in the environmental education programme, in ESD and which have positive effects on other aspects of education in and outside schools?

There are the teachers' answers connected to their teaching:

- practical, using hands-on methods and linking to theoretical methods;
- "soul to soul", science with emotion and arts;
- it is changing, "I like different activities";
- a liberal style is a help when working with the students;
- calm, friendly, open minded, communicative;
- democratic, informal, supportive, warm but setting high standards whilst giving praise;
- "I try to develop both problem solving abilities and reflection by the children by using playful methods;
- inquiry, problem solving methods.

One group of teachers mention open-mindedness and being democratic and liberal as basic characteristics of teachers, whereas another group focused more on specific teaching methods (for example enquiry based) and strategies (for example problem solving, reflection). One teacher's reply connected the arts to the natural sciences, another highlighted the need for employing a variety of activities.

These are the teachers' answers on their special focus in teaching:

- the values of our surroundings;
- contact between art and environmental education, sustainability;
- democratic attitudes and feedback;
- to teach how to think, how to obtain knowledge, how to become an independent individual and an autonomous learner;
- communication in team work;
- the value of the natural environment;
- increasing knowledge, take good care of children;
- increase the students' knowledge of facts and experience in practice.

There are three tendencies, the first group of answers mention knowledge and values as their specific focus in teaching in order for the learning process to be successful. The second tendency present in the answers places the learning process on the focus to help the students to be independent individuals and autonomous learners. The third group of teachers find team work and communication important in its contribution to successful teaching.

The answers of the teachers concerning the students impact on the teaching are:

- they give their opinion and reaction and they influence me;
- I work, plan my teaching with my students;
- I accept their opinions if I have good relationship with my students;
- I discuss the teaching process with them, preparation, teaching, evaluation stages;

- students influence my teaching in using effective methods, in scheduling, in finding issues;
- accepting original ideas and the suggestions of the students whenever it is possible.

All teachers responded positively to the idea that the students had an influence on their teaching, in planning, in evaluation, finding the appropriate method for teaching.

This is the first question where the answers were very similar.

The teachers' opinion on teaching with other colleagues are:

- “difficult because they are good scientists but not good educators”;
- “we share the task among others”;
- “in reality it is difficult to teach together but we do the planning together”;
- “we work in a team, exchange ideas on the school curriculum and the books we use in our teaching”;
- “we discuss the new methods and introduce them, we make presentations and discuss the problems”;
- the main focus is planning together;
- the co-ordination is basic in the interdisciplinary curriculum in the school between teachers promoting discussion and harmony.

All teachers find working together with other teachers an important aspect of their professional life. This is easier in planning, exchanging ideas on methods and resources and more difficult in team teaching. Any collective work in the school needs co-ordination between teachers, mainly in interdisciplinary curriculum work.

There are the teachers' responses concerning using outdoor activities in environmental education:

- outdoor activities are very useful if they are linked to classroom work;
- forest school, camps, excursions we plan as part of the school curriculum;
- we have a school garden and do outdoor activities linked to our indoor teaching;
- “I insert them in my teaching, long walks, excursions, visit to museums, zoo, summer camp, outdoor lessons”;
- the first-hand experiences promote the study of abstract notions.

All teachers state that outdoor activities need to be connected to indoor teaching and are very useful in environmental education/ESD. A few teachers see the connection between the school curriculum and outdoor activities and find that it is important for it to be built into the school curriculum.

The answers suggest diverse types of outdoor teaching: forest school, camp, excursion, maintaining the school garden, visiting museums, outdoor lessons in zoos.

In the teachers' responses on *the aspects of teaching which are successful in promoting learning and action for sustainability in the environmental education programme, in ESD and which have positive effects on other aspects of education in and outside schools*

- 1) development of the characteristic in teachers that they are open-minded, democratic and use innovative teaching methods, in indoor and outdoor activities based on the school curriculum.
- 2) a new focus in the teaching-learning process on developing the student as a reflective autonomous learner who is able to work in teams.
- 3) the need for team-working by teachers in the school on school development and in the development of the students.

Interview question 3: What are the elements of the process of innovative environmental education, ESD in learning and action for sustainability and the lessons participants learnt for the planning of future work.

There is the response of teachers on active participation of pupils in environmental education programs:

- “my students are very interested in active participation in the program and I encourage them”;
- rewarding, green points, postcards and excursions encourage students in active participation;
- a key point is planning an activity with the students and encouraging them during the process of action, we had success in this way with support for disabled students;
- NGO' s are very influential in promoting the active involvement of students;
- “if I explain the importance of the program and make it more attractive for the students they are more likely to participate actively”;
- project work is very influential in promoting active participation;
- planning, decision making and active participation come together in a successful program.

Teachers find the active participation of the students very important and encourage them without a clear explanation of the meaning of active participation. The teachers mention some useful activities and the importance of project work. One teacher indicated that “planning, decision making, and active participation should come together in a successful program”.

The teachers' respond on working with the media:

- working with local TV and daily newspaper promote innovative programmes;
- TV, radio and press give information to students about on-going programmes in the locality which they can join;

- local TV and press inform the local community about school activities and parents join our programs through the local community group;
- the school newspaper, produced by the students, helped the school to become more ecological and sustainable.

All teachers considered working with the media an integral part of the innovation in environmental education/ESD. In their answers the teachers explained that the media brings and spreads information and sharpens the opinion of the students and the community outside school, but inside schools, teachers can have a great influence on the qualitative use of media information.

Conclusions

Viewing education for sustainability as a contribution to civil society is fundamental to the characteristics of citizens being active, engaged, informed and competent in maintaining a civil society.

The long term goal of environmental education is to critically promote sustainable development:

- 1) to foster awareness of and concern about the interdependence of natural, social, economic and political systems at different levels through reconstructing knowledge.
- 2) to develop knowledge, skills, values, ethical dimensions and motivation for participation as active members of civil society.
- 3) to encourage students' critical reflection and decision making on their personal lives and promote civic participation to contribute to sustainable development.

Pedagogy today should involve the teachers' vision of what education is for and how society might be (Feinberg 1989). Reconstructivism in education involves the organisation of knowledge around a range of critical concepts, so teachers and students can become critical thinkers and students will then participate in community issues and develop their capacity to become active members of civil society.

In analysing the answers it was noted that teachers referred to a necessary change in the school curriculum, where the teacher acted as both catalyst and mediator in the development of the school in relation bringing together both children and their colleagues. Team work between school teachers is an important element in school development, in the improvement of democracy within schools and the influence this has on the social behavior of children.

The teacher' special focus on promoting pupils' successful learning is connected to

- 1) knowledge and values as their specific focus in teaching in order for the learning process to be successful.
- 2) the learning process that helps the students to be independent individuals and autonomous learners.
- 3) a focus on the team-work of pupils and effective communication makes a significant contribution to successful teaching.

The pupils' personal views have inevitable influence on their learning behaviour as Longham and Nortfield (1996) qualitative research indicates; the aim is to develop more active, independent and responsible learners who have positive views on school experiences.

The outcome of the interviews with the ten teachers after their successful study on the revised version of the Environment and Society course shows the importance of the reflection of teachers on their own work and the need for critical and system thinking in the present and in future actions. The summary of the teachers' and the writer of the present paper is:

The success aspects of teaching styles in promoting learning and action for environmental education, ESD is related to:

- 1) new characteristics of teachers, who are open-minded, critical, reflective, democratic and use innovative teaching methods, incorporate in- and outdoor activities based on the school curriculum.*
- 2) new focus in the teaching-learning process develops the students so that they become autonomous learners who are able to work in teams.*
- 3) the need for team-work by teachers in the school to aid both school development and the students' development.*

There is great need for these elements to be included in the training program of teachers in education for sustainable development with special focus on overall and specific competence development.

The revised Environmental and Society course implemented the CSCT competence model in Annex 1 successfully.

There appears to be a need for a more professional development of teacher education in Hungary. The revised version of the Environment and Society course focused on the improvement of reflection, critical and system thinking in the education situation.

The CSCT competence model developed skills and competences for participation in change, reflection on processes, acceptance of alternative visions, tools for the implementation of concepts and visions not only in education but also in the wider society.

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Case-study: “Industry in Telemark”

Course for teacher students, Practical Pedagogical Education

Marina Aase

Practical Pedagogical Education (PPE) is not taught as a subject matter (in Natural Science), but as subject didactics, meaning *what, why and how* (depending on for whom) teachers want to teach. In the spring semester 2005 the PPE-students did project work (PW) worth 15credits. PW is an actual method used in Norwegian schools (with elements of action research).

The course was motivated by and completed in co-operation with a Joint Organisation for Industrial Companies in Telemark. The goals of the project/course were to develop several competences for students - in accordance with the concept of sustainable development.

The work of each group resulted in a product which contained 3 elements: a portfolio, PW-report and oral presentation. Analyses of empirical data allowed for the discussion of the necessity/importance of different educators' competences, teaching materials etc.

Norwegian summary

Ved Praktisk Pedagogisk Utdanning (PPU) undervises det ikke I fag, men I fagdidaktikk (Naturfag), det vil si *hva, hvorfor og hvordan* (avhengig av for hvem) lærere vil undervise. Vår 2005 ble PPU-studentene tilbød prosjektarbeid (PA), 15sp. Prosjektarbeid er en aktuell arbeidsmåte i norsk skole (med elementer av aksjonsforskning). Kurset ble motivert av og gjennomført I samarbeid med Felles organisasjon for industrielle bedrifter I Telemark. Målet med kurset var å utvikle flere kompetanser hos studentene - i samsvar med konseptet om bærekraftig utvikling. PA resulterte i et produkt som besto av tre deler: portofolio, muntlig presentasjon og skriftlig rapport. Analyse av empiriske data tillater å diskutere nødvendighet/viktighet lærerutdanneres ulike kompetanser, lærermateriell osv.

The context within the institution

The course which is described below was completed in the spring semester of 2005 as a part of Practical Pedagogical Education (PPE). PPE is a one year course worth 60credits, and is designed for people in higher education studying one or more subjects who want to become teachers, but who lack formal pedagogical education. Those who apply for PPE are employed (on a preliminary basis) in the school system. Thus, PPE gives access to employment in the school system.

PPE consists of 30 pedagogic credits and 30 didactic subject matter credits, usually in 2 different subjects. For example, 15 credits of didactic mathematics and 15 credits of didactic science (the name of the school subject in Norway is *Science and Environment*). PPE is not taught as a pure subject, but as subject didactics, meaning *what, why and how* (depending on for *whom*) teachers want to teach a certain subject. The pre-requisite is that the students can have taken the subject at a higher education level.

Students who apply for PPE have often taken at least two subjects, which they want to teach in school, at higher education, for instance Mathematics and Science, or Norwegian and English. But there are some students with only one subject in their curriculum. These students only receive instruction in didactics for this subject corresponding to 15 credits. To make up the remaining 15 credits students are usually asked to write a paper with one of the didactics themes. The students may either select the theme themselves or choose it in co-operation with their supervisor. The theme has to be accepted by the supervisor/teacher of the course. The written paper (approximately 30 pages) will be assessed and given a grade.

In the spring semester 2005, however, the students with only Science as their subject received a different offer. The offer was defined as projectwork (PW) which comprised 15 credits. Project work is an actual method used in Norwegian schools (with elements of action research) which was established in the school reform (R94, 1994-1997). Projectwork has to do with problem oriented learning.

PW is defined as a pedagogical method of studying in which the pupils/students in co-operation with adults examine and treat a problem in the society in which the problem exists (L 97, Illeris). The outcome of the assignment is a product which can be presented to others. PW in school is usually a team work project and consists of the following steps/phases:

- Preparation: What do I/we want to examine? Selection of theme/problem.
- Planning: How do we want to examine the case/problem?
- Follow-up: Working with the case.
- Presentation: What is the outcome/result of our work?
- Evaluation: How did it go?

The course was motivated by and completed in co-operation with a Joint Organisation for Industrial Companies in Telemark (one of the 19 administrative districts in Norway). Their intention in co-operating with this project was to increase the recruitment of pupils' to professions within industry.

Therefore, the theme for the PW became: "The Industry of Telemark". Within this theme the students themselves selected and formulated a specific problem.

In Spring 2005 12 students selected PW instead of writing a paper. It was intended that the students would design educational schemes/teaching materials about industrial companies (see next point) and adjust them to pupils in the elementary and secondary school (up to 16 years old).

Goals of the project

The goals of the project/course were to develop competence for students in the following areas:

- Competence to master projectwork as a pedagogical method which is described in curriculum (L 97);
- Communication competence, i.e. to work and learn as a group and in co-operation with different actors in (the local) society;
- Competence to recognize and solve problems in local society using principles taken from a global context and in accordance with the concept of sustainable development.

These goals in our course should be reached by:

- Studying PW (theoretical) as a pedagogical method of teaching/working in school combined with the practical completion of PW with "Industry in Telemark" as the selected theme.
- Completion of PW in groups and in co-operation with specific companies in Telemark. Three industrial companies producing different products were selected (see following paragraph for details).
- Designing teaching materials about the industrial companies which are:
 - adjusted to pupils in primary/secondary school;
 - increase the understanding of the connection between society - production - consumption - environment;
 - stimulate and increase the interest for science and environmental subjects;
 - stimulate pupils/students to select a profession in industry/Science as their future occupation.

What have we done?

The work with the course can be divided in 2 phases:

Phase I: Autumn 2004

During the fall 2004 I (Marina Aase), established contact with the companies Yara (production of baking powder), Norcem (production of cement) and Union (production of paper). I was shown around and received documentation including description of the processes/productions. Based on these visits I made presentations about the companies to the PPE students. The presentations dealt with the companies' products and processes, economy, environmental views and initiatives taken to prevent pollution, history, and employment policy (briefly).

Phase II: Spring 2005

Projectwork (see p. 1) "Industry in Telemark" for the PPE students:

During the spring semester 12 students elected to do projectwork on "Industry in Telemark" as a theme. The students themselves were advised in their selection of one of the companies and in the formulation of a specific problem which they wanted to examine.

Preparation

On the first meeting (14.01.05) the students were informed about the project and received some background information about companies through the presentation from Phase I. Several possible goals, methods, results etc. in the students' projectworks were proposed and discussed in the preparation step. The general problems during the introductory discussions with the students were as follow:

- Which pedagogical/didactical principles should/ought to be the base for the teaching materials about industrial companies?
- What kind of knowledge should have priority?
- In which ways can/should the concept of sustainable development be brought in?

3 groups of students were established. Rules for co-operation within the groups were discussed. Rules such as:

- Should we have a formal leader of the group?
- On which basis can/should group decisions be taken?
- Where should the groups be assembled?
- Should all meetings be attended by all group members?

Planning

Planning started with a meeting which all the students attended. The students received all the available information/documentation about the companies. In the subsequent discussion important aspects of the PW were underlined, for instance:

- We were making agreements about dead-lines for handing in assignments.
- Each group had to make a time table for their work.
- The students had to make two/three visits to the company.
- Each group had to write a log book about their work.
- The members of a group had to make agreements as to who should be responsible for individual tasks within the group.
- Specific methods of work had to be selected for each group.

After that the groups worked mainly independently of each other, but in co-operation with the company and teacher (see Following-up). Work schedules were made in each group - in agreement with common discussions (see both Planning and Preparation). These work schedules could, of course, be corrected/changed during the project.

Follow-up

February-April 2005:

The students contacted the companies and made appointments for company visits. Each group/student had 2-4 visits. The visits included guided tours around the production lines, talks and interviews with company employees and the collection of extensive information/statistics concerning the activities of the companies. A representative of each company was responsible for each visit and for guiding the students.

The students did data collection at the companies, on Internet, and using other sources. They had regular group meetings - sometimes with guidance from the teacher, sometimes without. Throughout the projectwork a log book was written including group work and individual work.

During this period the students were supported in the writing of reports, making of teaching materials and preparation for presentations of the results/outcomes of their work. The reports were developed step by step with feedback from the teacher. The presentations were discussed orally with the teacher, but the results were shown only once on the day of presentation.

Presentation: 13.05.05

The presentations lasted for approximately 6 hours. Each group had 1 hour for the presentation of the projectwork and the following discussion. During the discussion sessions the group members were questioned by their fellow students and their teacher. They had to state the reason for their choices and defend the project.

The presentation was followed by a session of assessment. The fellow students and the teacher were together responsible for the assessment of presentations and for giving the

group a grade. The presentations given by each group were thoroughly discussed by the fellow students (see also *Output*).

Evaluation

After the presentation had taken place the student had a self-evaluation session with respect to each member's individual efforts as well as her/his contribution to the group work. The individual student's contributions to data collection, report writing, and presentation were evaluated in co-operation with fellow students from the group.

Output and assessment of students' work:

The work of each group resulted in a product which contained 3 elements:

- A portfolio (log book) which was made by the students during their individual and group work. This portfolio consists of students' notes about how, when and where they worked with the projectwork.
- Projectwork report, about 30 pages.
- Oral presentation of the projectwork.

These three parts were assessed in the following way:

- Internal marking of the students' log book. The course teacher was responsible for this part of assessment.
- Internal review of the oral presentation of project work. The teacher and fellow students shared the responsibility for the assessment which took place at the common discussion (see also *Presentation*). The fellow students had the main responsibility, in the sense that the vote of the fellow students counted more than the vote of the teacher where there was disagreement.
- Internal and external marking of written projects reports (approximately 30 pages). An external marker from another institution in co-operation with the teacher of the course determined the grade on the students' project reports.

How did we do research in this project?

The project/course was not intended to be a typical research project, but first and foremost a development project. That is the reason why no research questions were formulated which were supposed to be answered in the project. Nor did we plan any special methods for data collection such as students' interviews, question forms, and similar aids (except a form for course evaluation which the students were supposed to hand in the last day of the project). Therefore, description of the empirical data is based on observations and reflections made throughout the course and in the finishing process.

Projectwork "Industry in Telemark"

When the students with only science in their curricula were confronted with the choice between projectwork (group work) or an individual paper, several of them reacted negatively towards PW.

Common practice (see also p.1) is that each student him/herself or in co-operation with supervisor selects a theme as a task for a written paper, usually based on theory with little practical orientation. The task is individual, demands no classroom attendance or co-work with other students.

Several students did not like having to attend more meetings and experiencing greater supervision (in addition to company visits) than they had expected. Others students, in particular those who had little or no experience of teaching practise, were happy to have the opportunity to co-operate on several levels (with each other, with the companies, and in closer contact with their tutor). These students, however, had problems with making their choice. Generally speaking, the students were not motivated enough to engage in the "newer" teaching methods they were offered.

Some of the students had, in advance, negative attitudes towards PW. Perhaps the reason for this is that PW was introduced in the school system without any specific training given or offered to the teachers. The feeling of insufficient guiding lines caused confusion and irritation in the teaching staff, and intense debates, also in the media (Aftenposten). Negative attitudes from many teachers, as well as from parents, were shown.

Following vigorous discussions only 1 student chose to work independently, all the others formed 3 groups doing project work (team work). One student, however, had both Science and Mathematics in his curricula, and therefore in no need for additional 15 points, but he still found project work so interesting that he volunteered to join.

The group rules which the students agreed to and which were intended to form the basis of co-operation were:

- None of the groups wanted a formal selected leader.
- Every one should have a say when decisions were to be taken.
- The students agreed to where the groups should meet.
- Some meetings were mandatory for all group members, in other cases the students could work together in pairs.

As a result of the plenary discussions as well as group discussions all three groups selected environmental politics in industry and the environmental protection efforts of companies as the most important topics of their work. Underling this society's focus on sustainable

development (as mentioned before, the course was planned as a course about *Science and Environment* didactics). Otherwise, each of the groups selected somewhat different pedagogical/didactical approaches in their work at the different companies.

Through the co-operation with the teacher/companies the students become more motivated and interested in projectwork. After a while the course was characterized by a high degree of independence and reflection on behalf of the students. Still, there were 2 students who were not satisfied, feeling they had been forced into projectwork.

Parts of the teaching materials that the students were developing were tried out at practice periods at some schools. The students stated that their experiences from practice periods were positive, for teachers as well as for pupils.

The presentations were a very intensive and visual part of the work. The students in each group made a comprehensive CD-room with the teaching materials that they had developed on their respective company, which, in part, was included in the presentation. The students used Power Point, role play, and scientific experiments in their presentation.

The fellow students showed significant interest in each others work, and the discussions following each presentation were comprehensive as well as constructive. The students expressed pleasure at being given the opportunity to show their work, which they were proud of, and welcomed the fact that their efforts were appreciated by their fellow students as well as their teacher.

The evaluation-step where the students in each group reflected on their own work was short and somewhat boring (perhaps not organized well enough by the teacher). The students were reluctant to express critical remarks about their own work/working process as well as others. Not that they were boasting of their working process, but they were mainly interested in the teacher's comments. They meant that all members in the same group received the same grade although it was obvious that some of the students contributed much more than others, while some students neglected their assignments.

Analyses of empirical data

As mentioned before (see p.4) the project was not planned as a research project, but as a development project. Therefore, no special instruments for analysis were selected/developed. That is why the analysis is short and based on reflection on the work in addition to help from/by the instrument (see the *Concepts for ESD competences in teacher education*) which was developed in the Comenius-2 project.

The experiences show how difficult it is to design a course which meets the demands/wishes/expectations of most of the students, and at the same time satisfies sustainable development (SD) aspects in Comenius-2. The teacher students are on the one

hand concerned about their personal freedom as to courses and working methods they can choose, but on the other hand they have the tendency to choose traditional ways and rule out the progressive demands which society in general expects of modern teaching.

Among the concepts which ESD emphasizes, the course has focussed on the students' *reflecting* and *systems thinking*, in addition to action competence. Values came up through questions about environmental protection in addition to problems linked to choice of occupation. *Emotions* were not treated to any considerable extent.

We also tried to include systemic connections between the human, environmental, social and economic aspects of SD (and ESD). The aspect which had the least focus in the course was economics.

What have we learned for future planning?

The course which is described above was offered only to students who had taken Science as a single subject, but our aim is to prepare a course which may be offered to PPE-students independently of their curricula, and also offered to teachers in training.

The course may be regarded as a first step, a starting point for designing one/several more advanced courses at our college - a process that will be aided by the work of the Comenius-2 project.

This will necessitate a closer co-operation between teacher educators from different subjects. More extensive student guidance will also be necessary from different actors, not only within the teacher education institutions, but in society as well.

The teacher educators' guidance competence should be developed and expressed more specifically. The teaching supervisors' systematic insights into the more independent steps of the students' work, assessments during the process and constructive feed-back have to be present throughout the period of work.

No "ready-made" teaching materials were used in the course except the description of projectwork in the curriculum. By working with Comenius-2 we received knowledge about different teaching materials which were produced by actors at national as well as international level. We look forward to the development of some specific teaching aids - for both teacher students and teacher educators in Education for Sustainable Development for the Norwegian market.

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Education for sustainability in initial primary school teacher education

a proposal of innovation

Mercè Junyent

Introduction

The aim of sustainability has redefined the role of schools and their relationship with the community. A school which is committed to Education for Sustainability (ES) is committed to teaching for the future, inviting its students and teachers to enter into the “culture of complexity”, into the use of critical thinking as a way of exploring and confronting challenges, into the clarification of values, into reflection on the value of action and participation and into the revision of its teaching materials and methods in the light of ES (Breiting, Mayer & Mogensen, 2005).

ES seeks a transformational educational role in which people commit themselves to a new way of looking at the world, a new way of thinking, learning and working. People need not only the ability to explore the relationships between their own lives, the environment, social systems and institutions, but also to become active, decisive participants in the process of change (Tilbury & Wortman 2004).

In this context, the idea of a school as a “complex system”, as a “learning organisation”, stimulates new ways of thinking derived from the climate of the school and its internal relationships. These new ways of thinking and acting need teachers' training institutions to work on competencies which will allow teachers to face the challenge of ES firmly and confidently. These competencies should be directed towards the acquisition of skills such as critical thinking, reflection, and action, anticipation and imagination of the future, dialogue and negotiation, collaboration and team-building.

Environmental Education for Sustainability course in Initial Primary School Teacher Education: a proposal of innovation

The initiative presented here is carried out from the perspective of Environmental Education for Sustainability and as a catalyst for Education for Change.

This course in Environmental Education is given as a year's course, compulsory, within the Primary School Teacher Studies course (1st year), and is worth 8,64 ECTS. The teachers of

the course belong to Area of Experimental Sciences and the Area of Social Sciences of the Department of Subject-Specific Education, in the Faculty of Education at the University of Girona (Spain). The subject is titled: *Environmental Education, Consumption and Health*

Aims of the initiative:

This proposal of innovation arises from the need:

- to reduce the gap existing between the theoretical framework of Environmental Education for Sustainability and its teaching transposition in the initial teacher education;
- to contribute to a specification of the strategies and methodologies of more appropriate participation to achieve the objectives of EES in the initial teacher education;
- to connect the initial training with inquiry and research into EES, and with the interests of a real and close community in order to achieve a greater relevance of the process;
- to work the professional teacher abilities that should be directed towards the acquisition of skills such as critical thinking, reflection, and action, anticipation and imagination of the future, dialogue and negotiation, collaboration and team-building.

The research connected to the course intends:

- to explore the learning process on environmental education for sustainability through the tools designed for promoting student reflection, specially the group diary.

Foundations of the Environmental Education for Sustainability course in Initial Primary School Teacher Education

The methodology designed and used in the course arose from the need to fill the existing gap between the theoretical framework of Environmental Education for Sustainability and its didactic approach into initial teacher education. Furthermore, we hope to contribute to the education of teachers who are investigative, critical and reflective, with the will and the capacity to encourage cooperative work, and with the capacity to take on and incorporate an environmental dimension to their professional activities.

Framing the course there is the consideration of the importance of the *hidden curriculum*, because greening the curriculum does not mean simply including environmentally related content, but involves profoundly rethinking the methodology that we use in the practical development of this curriculum. It is important to rethink not just the content of the training, but also the methods used to transmit this content, since the teaching model always behaves as a hidden curriculum of the teaching. That is to say, the model the students learn from spreads further as they exercise their profession, since it becomes,

even if involuntarily, the model for their behaviour. When what we are dealing with is a teaching/learning process on Environmental Education, we cannot undervalue its ethical basis. Attitudes and values in this process form part of the hidden curriculum and, therefore, cannot be in flagrant contradiction of the principles of Environmental Education for Sustainability..

The framework of the Environmental Education for Sustainability course is built from:

a) the components of Environmental Education, as clarified, redefined and synthesised by Tilbury (1995):

- EE is relevant,
- EE is holistic
- EE is values-orientated,
- EE is issue-based,
- EE is action-orientated,
- EE is critical education.

b) the concepts of Professional development training programmes in Environmental Education (Robottom,1987,1996):

- participatory and practice based,
- based on investigation,
- critical,
- linked to the community,
- collaborative.

Robottom argues that these concepts are an indispensable part of continuous teacher education and we believe that they should also form part of initial teacher education.

c) the reflection-in-action perspective of environmental education (Hart, 1990): "*... Teacher education programs based on a reflection-in-action paradigm emphasise a process model of education where teachers (and teacher educators)... monitor and evaluate their own practice reflexively, that is, an action research model, a cyclical process in which teacher action-reflection-improved action is seen as a dialectic between theory and practice, much like the principle of reciprocal relationships is viewed in ecology.* (p.15)

d) the dynamic qualities (Posch, 1990): the challenge of the complexity in Environmental Education (Mayer, Losito, 1995) justifies and requires the development of dynamic qualities, which are understood as a set of attitudes and skills that give structure to and change situations (Posch, 1990). Environmental Education for Sustainability has to promote dynamic qualities such as: initiative, independence, creativity, responsibility and self-confidence (empowerment).

e) the ACES Model (Ambientalización Curricular de los Estudios Superiores - Greening Curriculum of Higher Education) (Junyent & Geli, 2003)

- f) The ACES International Network was to set up a framework of characteristics that could orientate the greening of the curriculum at different levels: institutional dynamic, programme of studies, subjects, research and extension programmes. According to this ACES Model, greening the curriculum implies:
- 1 Integrating the paradigm of complexity in the curriculum.
 - 2 Introducing flexibility and permeability among disciplines.
 - 3 Contextualizing the curricular project.
 - 4 Taking into account the disciplinary construction of knowledge.
 - 5 Considering the cognitive, affective, and action aspects of people.
 - 6 Trying to find a balance between theory and practice.
 - 7 Working with future orientations and perspectives and alternative scenarios.
 - 8 Adapting new teaching and learning methodologies.
 - 9 Creating space for reflection and democratic participation.
 - 10 Reinforcing the commitment to transform relations between society and nature.

Methodological approach of the environmental education course: investigation, reflection, cooperative work

The course, in the framework of the references explained in the previous section, is carried out with a methodological approach based on three processes, understood as interdependent ones:

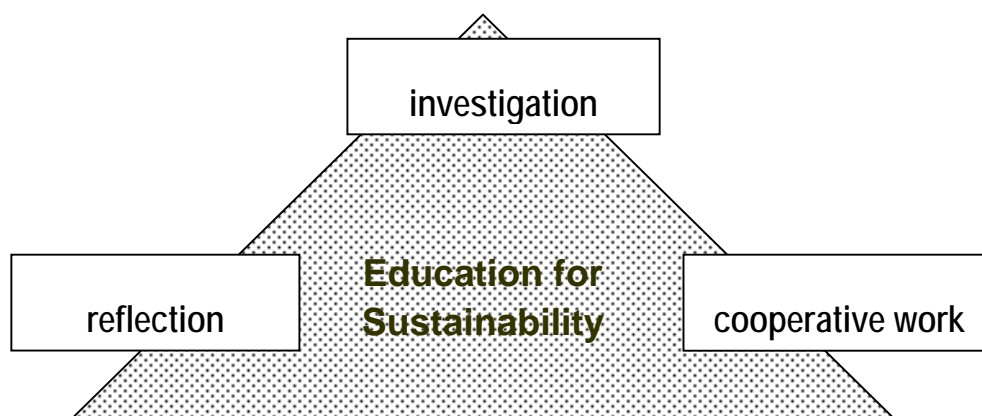
- process of investigation,
- process of cooperative work,
- process of reflection.

The *process of investigation* is a research study into the environment that the students carry out during the whole course and which is connected to their teaching practice by means of the elaboration of a didactic application in Environmental Education for Sustainability. The research and the application are tied to a specific community and environment.

This process is done within the nucleus of the *process of cooperative work*, because we assume the social construction of the knowledge and we understand it through reflection.

A *process of reflection* is encouraged during the processes of investigation and cooperative work. Both group and individual reflection is fed by the other two processes.

These three processes are the three principle axes of the methodology that we apply. We see them as able to support a framework of Environmental Education based on the theoretical references that we have considered. We have called our methodology “a three-axis methodology” (Junyent, 2002)



A Methodological Approach: process of investigation, process of reflection, process of cooperative work

Teaching the course

The course requirements for the students are:

- participation in the “theory” sessions on the basic principles of Environmental Education for Sustainability (1st semester);
- cooperative work on environmental issues. “*The image as a tool for promoting questions*”(1st S);
- cooperative inquiry work in an entity/equipment selected by the students (examples: museum, civic centre, municipality, school, library, neighbourhood association, nature centre, old people’s home, etc) (2nd S) (Appendix 1);
- making an Environmental Education for Sustainability teaching proposal for the studied equipment and specific didactic materials. (2nd S) (Appendix 2);
- undertaking a process of reflection about their learning and the work process itself (1st and 2nd S);
- public presentation of the research and teaching applications (2nd S);

- Self-assessment (individual and group) and tutorial sessions (1st and 2nd S).

The students' research and the teaching proposal are tied to the community.

There are tutorial sessions, written test, the didactic proposal, as elements for the evaluation of the course.

The research

Research took place as action research within the critic theory paradigm.

The sample consisted of the class group (42 students) which took the obligatory *Environmental Education, Consumption and Health* course.

The analytical tools were:

- the individual and collective reflection instruments used on the course: questionnaires and the diary group;
- the didactic proposals;
- the researcher's portfolio.

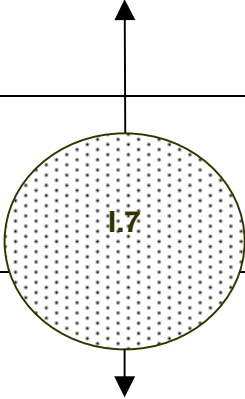
The nuclear instrument was the group diary, so this case study focus on it.

The process of reflection

As we have said, the process of reflection is an inherent part of the course due to the particular theoretical framework we have taken on, and we understand it as a process which is interdependent with the research work and the cooperative work. The dynamics of the process of teaching/learning is conducted through the encouragement of participation, debate, communication and dialogue.

To encourage this process of reflection, we have used various strategies and tools, but the key tool has been the *group diary* and we have given it a great deal of relevance in this process, since it is the strategy conceived to encourage processes of reflection of the group as a whole and is what guides us throughout the process.

Other tools for reflection are based on: encouraging questions, from individuals or groups; strengthening group dynamics and methodology that favours explaining the diversity of ideas, opinions, arguments as well as debate and communication; individual questionnaires, to encourage individual reflection; tutorial sessions, in groups, with teachers.

Timing	Individual Instruments	Group Instruments
Start of course I.1	Students come up with questions on Environmental Education	
Start of course I.2	Initial questionnaire	
During 1 st term I.3		Environmental issues work: <i>The image as a tool for promoting questions</i>
End 1 st term I.4	Students come up with questions on EE Questionnaire on learning	
End 2 nd term I.5	Questionnaire for the responsible for the group diary	
End 2 nd term I.6	Questionnaire: Final assessment	

The individual tools for promoting reflection are concreted on:

Tool I.1

Which questions, for the moment, do you think about Environmental Education?

Tool I.2

a) If this subject was optional, would you have selected it?

Yes No

Why?

b) What do you expect from it? What would you like to learn?

c) From your point of view, which are the objectives of the Environmental Education?

d) For you, which is the meaning of «environment»?

e) How do you feel about this subject?

f) Answering this questionnaire has had some meaning for you?

g) Do you want to add a doubt, suggestion or comment?

Tool I.3

Group activity based on the analysis of an image, which will be the starting point in order to prepare a short report on an environmental issue. The report will be put down on line.

The activity intends to:

- promote questions
- promote discussion of ideas
- work on different perspectives of the environment (the concept of the environment is often too limited)
- initiate processes of group work (internal debate, negotiation, coordination, task distribution, interaction...with other groups, organization, etc)

(see Appendix 4)

Tool I.4

a) At the beginning of this subject you posed some questions related to Environmental Education

Now, which new questions could you express?

b) With regard to your pre-conceptions on EE, which ideas or concepts have been more relevant or news?

What do you can say that you have learnt? (Think about content, methodology, activities, etc.)

Tool I.5

DIARY'S RESPONSIBLE

QUESTIONNAIRE

- What do you thought about the decision that you would be the responsible for writing the diary?
- Has the diary been a record of your personal reflection or did you often consult your colleagues what had to be written?
- Which aspects, of the group work (debates, dynamics, discussions, organization,...), do you think could be more influenced by the fact of recording the work process in a diary?
- What have you learned being the diary responsible?
- Which difficulties have you found?
- How did you feel writing the diary?
- If the responsible had been another person of the group, in which aspects do you think it would have been different?
- Which other tool could be useful in order to record the processes of reflection, inquiry, work carried out by the group?
- Suggestions/comments/doubts...whatever you like to say...

The group diary

The key tool has been the *group diary* and has a great deal of relevance in this process, since it is the strategy conceived to encourage processes of reflection of the students.

Reasons for using a group diary

The group diary is considered as a multidimensional document, since it provides insight into the dimensions of training, reflection and research. These three dimensions should be intimately linked in teacher education and should form part of the profile of today's teachers. Other reasons are:

- Thinking and reasoning emerge from dialogue with others and are the echo of many dialogues and interactions.
- We subscribe to a point of view concerned with the social dimension of thought, the social construction of knowledge and with understanding the educational process in its relational, social and life experience context.
- We subscribe to a methodology based on reflection. And reflection, to quote Kemmis (1988), is not an individualistic form of mental work, but rather it both presupposes and prefigures social relationships.
- One of the central components of the Environmental Education for Sustainability course is based on the process of group work and group learning. We believe it to be coherent with this to strengthen the training tools that make group reflection easier.
- Environmental Education for Sustainability is critical education and therefore implies creating good conditions for helping people to be socially critical, by means of developing their capacity to make decisions and agreements, to be tolerant, to respect other points of view and to expound on their opinions.

Using the diary was considered as a strategy that would help to make things clear and to provide a vehicle for reflection on the work and the process of learning that the students were going through; and also a strategy that would allow researchers to make their analysis; that is to say, a *diary* as a *training (and reflection) strategy* for the students as well as a *research strategy*

The diary should contribute to:

- Conveying reflections.
- Recording personal thoughts, feelings and emotions.
- Defining and establishing objectives and strategies.
- Controlling the progress of the work.
- Recognising and becoming aware of the learning.
- Assessing the work process.

The structure of the group diary

According to the typology offered by Holly and McLoughlin (1989) and Elliot (1991) - log, diary, journal - we would class the diary used as more like a *journal*, since it was meant to include facts, objective data and descriptions, but also spontaneous and personal thoughts and feelings.

The group diary is structured in two parts (see Appendix 3):

Part A – no guidelines (non-standardised)

A section with no guidelines, where entries could be made in the most personal way about the whole process of research and group work, discussions, decision making, group dynamics, organisation, etc., without omitting thoughts, reflections, personal sensations, preoccupations, etc. This would be similar to the kind of entry made by a participating observer.

Part B – with guidelines (standardised)

Here, beginning from certain given points, the group as a whole is asked to reflect and include in the diary their ideas, concepts and conclusions.

These given points were as follows:

- formation of the group;
- selection of the research subject;
- initial diagnosis of the subject;
- beginning of the didactic application;
- development of the research;
- advanced didactic application;
- global assessment of the work process.

In the course there is one diary per group. One person from each group, always the same, will be in charge of keeping the diary. The group decides who that person will be.

The analysis of the diaries

The analysis of the diaries is based on an *inductive* dynamic, because while examining the data we were reflecting on their content and deciding which topic could be covered by each unit. Each meaning unit receives a provisional *verbal code*. In this way provisional categories are proposed, which can be consolidated, modified or even eliminated, based

on how they contrast with the data grouped in the same category or with data included in other categories. This is what Strauss (1987) called *open codification*. The analysis of the content of the diaries has followed a widely accepted process in qualitative research.

Being a diary made up of two parts, of differing natures, has conditioned the analysis. So Part A, which is the free record kept by the person responsible for the diary, has meant not starting from any category. In this sense there has been an entirely inductive categorisation from the very beginning.

The analysis of Part B has supposed that it started from an initial request, since a topic was proposed and the group had to reflect on it and conclusions about it or what the group thought was important to state about it had to be recorded by the person responsible for keeping the diary. The process, however, does not stop being inductive, because the different meaning units categorised are extracted from the proposed point.

In relation to the analysis of the content of the student group diary we can conclude:

The analysis of the Part A- No guidelines

The first part of the diaries allows us to draw up the following categories and sub-categories:

CATEGORIES	Sub-categories
Work processs	Information: research and treatment Motivation Rhythm of Work Organization
Difficulties	
Group Dynamics	
Feelings	“Pleasant feelings” (satisfaction, confidence, pleasure, etc.) “Unpleasant feelings” (displeasure, anxiety, fear, etc.)
Assessments	Training Positive assessments Negative assessments

Some relevant findings in the analysis of this part are:

- *Work process*: A deficiency in the formulation of objectives is detected, in the case of the research work as well as the educational application. In the latter, the tendency is to first think and collect activities and then define the objectives. This point leads us to reflect about what “doing research” and “elaborating a research report” means for the students.
- *The information search* is one of the aspects that should be considered in depth, since it emerges here and also in the other part of the diary. The majority of the students are "obsessed" with looking for as much information as possible, without previously establishing criteria or without clear objectives. Then they do not know what to do with the information, with the data, or how to analyse or deal with it.
- *Group work*. They are conscious of working in groups, and some of them stress this idea and discover what it really means to work in a group. This level of awareness of cooperative work is advantageous to having to carry out intense fieldwork, on site work, work with people. It spurs in them a greater implication in the work in which many individual and group factors have a bearing: initiative, participation, commitment, responsibility, independence.
- The research work creates more preoccupation than the elaboration of the educational application.
- A good *group dynamics* is essential for projects of this type, since it requires knowing how to listen to others, making contributions to the group, finding avenues of dialogue, making decisions without producing tension or conflict, learning to overcome personal differences and working in a "professional" way.
- *Feelings*: It has been classified feelings as pleasant and unpleasant. Among the first it has included those that promote moods typical of a good group dynamics, working atmosphere, motivation and interest. They are capable of expressing pride in a job well done, satisfaction with group work, enthusiasm created in the atmosphere. The feelings called unpleasant are focused mostly on states of discouragement and disappointment, and strongly connected to moments when students felt they were lacking information and suffering from limitations, for instance, not enough time.

Part B – with guidelines

The analysis of the contents of Part B is what informs, above all, about the degree to which the students have integrated the components of Environmental Education, which criteria they have taken into account, what they prioritise in their educational proposals. Therefore, it informs us of the initial level of acceptance of the components and methodology of environmental education for sustainability.

Therefore, it informs us of the initial level of acceptance of the components and methodology of environmental education. In that way we confirm that they prioritise the objectives of approaching the complexity of the context, of dealing with topics from a

holistic perspective (human relations, nature, economy), of promoting attitudes and values, of working on procedures, skills and strategies, of respect for other points of view.

The students have assessed to a great extent the methodology used in the course, especially because it provides the possibility of carrying out real work on site, connected to a specific community and because it gives meaning to their projects.

Both parts, A (non-standardised) and B (standardised), while different, are complementary and both are necessary if the aim is to obtain a global approximation of the students' thinking throughout the process they have followed. Contradictions between them were not detected, and together they permit an internal data triangulation.

The analysis of the contents has allowed us to find certain deficiencies in the general training of these students as some difficulties they had organising themselves and following a process of investigative work: definition of objectives, dealing with information, drawing conclusions. Also, certain difficulties exist despite the emphasis placed on educational proposals in different courses during their studies. We realise that, for example, they are interested in collecting and preparing activities before they define which objectives they would like to attain.

Analysis of the contents by themselves makes it difficult to assess if there have been significant changes over the course of time in relation to a greater degree of reflection; that is, being able to assess if recording the process in the diary means an increase in student reflection.

In the analysis of the diaries we have noticed that the personal conflicts within the groups are not always resolved or resolved well. If it were not for the record in the diary, these conflicts would go unnoticed by the rest of the groups and especially by the lecturers, given that in the classroom sessions and in the tutorials they would not have been reflected. The record is, therefore, a way to go deeper into the most personal process of group work. It would be good to include, at some point in the work process, in the encounters between lecturers and the groups, a way to monitor this aspect, to see if the groups need orientation, of what type, to find different ways of resolving the tension and conflicts, all this vis-à-vis working on "how to work in a team".

The analysis of the content allows us to delve more deeply into knowledge of the thinking, the process and the evolution, not only of the record keeper, but also of the whole group.

Conclusions

Some conclusions about the course from the research are:

- The diaries have an important descriptive character. In them are recorded the working process, the programme of action, the field work, the interviews conducted, etc.
- Analysis of the contents by themselves makes it difficult to assess if there have been significant changes over the course of time in relation to a greater degree of reflection; that is, being able to assess if recording the process in the diary means an increase in student reflection. However, this function of favouring reflection is expressed in the final questionnaire completed by those responsible for keeping the diaries.
- The diary has a training function. It is a strategy that facilitates learning about controlling work, organising groups, clarifying and synthesising ideas, explicitly stating errors. It has a training function in relation to the work and to values, such as responsibility and commitment.
- The motivation and interest for ES increases through the development of the course.
- Awareness about the need and significance of the ES is achieved.
- Emphasis on the reflection is valued as essential in an educational environmental process.
- The methodology of the course improves students' empowerment in order to deal with a holistic perspective, carry out research and produce didactic materials on ES.
- Cooperative work improves learning on: different thinking and working ways; how to deal with different points of view, environment included; effective planning, organization and work.
- It reinforces creativity, initiative, trust, autonomy, responsibility and a pleasant and adequate work environment as well.
- The process has contributed to build and reinforce a conception of the teacher as investigative, reflective, active, critical, open-minded and environmentally involved and conscious.
- Working on a real situation is valued as a key component of the methodology. It brings motivation, relevance, interest and a wish to make some good and useful research and didactic materials.

Some research questions arise from the work carried out, mainly in the critical thinking aspect:

- Can we detect a process of development in the students' thinking towards more critical positions?
- How the process of critical thinking in student teachers could be analysed?
- The course and the applied methodology, do they promote any change on a critical thinking development?
- Are the changes lasting? How to know?

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Appendix 1

GUIDELINES PROPOSAL FOR THE PRACTICAL WORK IN ENVIRONMENTAL EDUCATION

General Objectives

- Knowing and analysing the operation of an entity directly or indirectly related to Environmental Education (Natural Parks, naturalist organisations, civic centres, educational centres, educational learning camps, municipal services, hiking clubs, etc.).
- Presenting contributions/proposals in Environmental Education for the entity studied.

Considerations

- Work in small groups (3-4 persons).
- Each group should select the entity they wish to analyse and study.
- It is important to consider the work being carried out within the framework of the entity: its objectives, the people to whom it is directed, its operating structure, its financing, its educational proposals, its resources, etc.
- It is advisable, once the group is situated in the co-operating entity, to make contributions/proposals that are aimed at improving, or including, educational action in Environmental Education.
- The proposals devised should be well defined, following the guidelines proposed. The work should be original and innovative.

- Being Environmental Education proposals, they should coherently and consistently integrate the conceptual , methodological and ethical components of Environmental Education.

PRACTICAL WORKS

(This guideline should not be thought of as a fixed proposal, but rather as one adaptable to the necessities of each group).

PART I: Description of the entity

- Typology.
- Objectives.
- Operating structure.
- Contents/ educational proposal.
- Methodology.
- Resources.

PART II: Environmental Education proposal

1) Summary:

- Implementation context of the proposal.
- Target public.
- Key concepts.
- Procedures to be developed.
- Attitudes and values to be encouraged.
- Expected timetable.
- Material resources and infrastructure.

2) Development of the proposal

- General objectives.
- Contents: conceptual, procedural, attitudinal and ethical.
- Detailed planning of the proposal: implementation process, development, etc.
- Material necessary for its implementation: guidelines, texts, images, games, work plans, etc.
- Anticipation of new human resources, materials or infrastructure needed to carry out the proposal.
- Monitoring and evaluation of the proposal.
- Suggestions.
- Bibliography.

3) Group assessment of the working process carried out

Some projects carried out:

TITLE	TOPIC
Where are you going without the shopping basket?	Environmental Education Campaign for the Municipal Market of Girona
Organic Gardening at the UdG	Travelling Exposition in several faculties of the UdG
Water, what do we know about it?	A three-day programme integrated into the educational proposals of the organisation "Sortim, educació i lleure"
Naturalist Organisations. Towards a new concept of environmental volunteerism	1 st Conference on Environmental Volunteerism in the Aiguamolls de l'Empordà (Empordà Marshes) Natural Park
Environmental Education for young people in Estelí, Nicaragua	EE Programme for young people in the Panamá-Soberana school of Estelí Collaborating institutions: <i>Familias Unidas, Centro Universitario Regional del Norte</i>
Sustainable Mobility	Educational programme to be integrated into the activities of the civic group " <i>Mou-te en bici</i> " (" <i>Get around by bike</i> ") of Girona
Environmental problems in Calella	Environmental Education activities for students studying for the secondary school diploma in sciences

Outing to the Pilar d'Almenara	Environmental Education itinerary integrated into the activities of a scout group
Little Mariona	Proposal for the Documentation Centre of the Natural Park of Sant Llorenç del Munt i l'Obac. Childhood Education (story telling and marionettes)
Social Centre of the Màquia	EE set in an organisation characterised by participatory assembly: focal points of action
The "Confetti" Nursery School	Greening a nursery school (0-3 years)
The Bosc de Palau (Palau Woods) EE stand	Organisation of EE activities at the Lesisuresport Fair (Fira del Lleuresport), GeiEG (Girona Hiking and Sports Group)
The oil of our grandchildren	Proposal for the house-to-house collection of vegetable oils, addressed to the City Council of Girona
Environmental Education at the Joanot Martorell Secondary School	Reorienting an elective credit in ecology towards Environmental Education
An excursion to Les Madrigueres and an itinerary through the dry stone constructions in la Bisbal del Penedès	Design and implementation of two itineraries, integrated into the activities of GEVEN (Ecologist Group of el Vendrell and Baix Penedès)

Appendix 3
THE GROUP DIARY

University of Girona.

Faculty of Education and Psychology.

Primary Teacher Education.

Subject: EDUCACIÓ AMBIENTAL, CONSUM I SALUT.

1r Course of Primary Teacher Education.

Academic Year:

Teaching staff: Dr Mercè Junyent; Dr Rosa M. Medir

Group

Diary Responsible

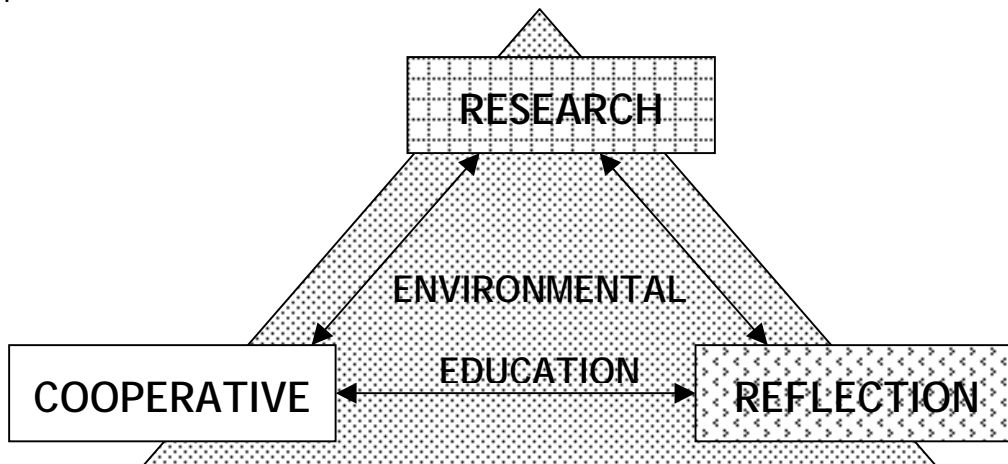
Entity/facility object of the study

Educational proposal

ENVIRONMENTAL EDUCATION, CONSUMPTION AND HEALTH: A METHODOLOGICAL APPROACH

The environmental education course is carried out with a methodological approach based on three processes, understood as interdependent ones:

- process of investigation;
- process of cooperative work;
- process of reflection.



The process of investigation is a research study into the environment that the students carry out during the whole course and which is connected to their teaching practice by means of the elaboration of a didactic application in Environmental Education. The research and the application are tied to a specific community and environment.

This process is done within the nucleus of the process of cooperative work, because we assume the social construction of the knowledge and we understand it through reflection.

A process of reflection is encouraged during the processes of investigation and cooperative work. Both group and individual reflection is fed by the other two processes.

THE GROUP DIARY

One component of the proposed work is reflection on the learning process itself.

As we cannot carry out *reflection in action*, understood as a process of reflection on the educational practice itself involving feedback, we believe that students can reflect upon their own *action learning*, which should contribute to the *teaching action* that they will carry out during their professional lives.

It has been suggested that there be one diary per group. One person from each group, always the same, will be in charge of keeping the diary. The group decides who that person will be.

The diary should contribute to:

- Conveying reflections.
- Recording personal thoughts, feelings and emotions.
- Defining and establishing objectives and strategies.
- Controlling the progress of the work.
- Recognising and becoming aware of the learning.
- Assessing the work process.

Group reflection record:

Written record of the reflections of the entire group at key points during the work process: group training, choosing the entity/facility and the educational proposal, final overall assessment...

The person in charge of the diary should take into account aspects such as:

- Reflection: reflections that stand out, degree of reflection...
- Communication: level of communication among the members of the group, discussions...
- Cooperation: level of group integration, task distribution, leadership and initiative issues...
- Difficulties/annoyances/errors...
- Success/advances...
- Decisions: decisions made, wrong decisions, right decisions...
- Learning: learning situations, what I have learned, etc.

SESSION GROUP REFLECTION No.

(use as many pages as you need)

Date:

Attendance

Group formation

How was it done? Which elements were important when forming the group? Which previous work experiences do you have in common? How did you decide who is in charge of the diary?

SESSION GROUP REFLECTION No.

(use as many pages as you need)

Date:

Attendance

Selecting the entity/facility to be studied

Why was it chosen? What was the selection process like? What difficulties did you encounter? What was taken into account? Were there any elements negotiated among members of the group?

SESSION GROUP REFLECTION No.

(use as many pages as you need)

Date:

Attendance

Initial diagnosis What do we know about the chosen entity/facility? How do we begin? How do we organise ourselves? What difficulties do we anticipate?... Faced now with this research work you have to direct, how do you feel? (Motivation, interest, curiosity, fears, laziness,...)
--

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SESSION GROUP REFLECTION No.

(use as many pages as you need)

Date:

Attendance

During the research work at the entity/facility
How is the research going? Does it still interest us? Why?
How do we feel? What are we learning?

SESSION GROUP REFLECTION No.

(use as many pages as you need)

Date:

Attendance

Initial educational proposal

Which topic was chosen? Why? What was the selection process like? What was taken into account or given priority? From the start, which goals did you set for yourselves?

SESSION GROUP REFLECTION No.

(use as many pages as you need)

Date:

Attendance

Revised educational proposal

With respect to the initial educational proposal, have the goals been changed? Has the chosen topic been changed?

Which difficulties would you point out?

SESSION GROUP REFLECTION No.

(use as many pages as you need)

Date:

Attendance

Global assessment of the work process

How have you related the research work with its educational applications? What was the process like (easy, complicated, fast, ...)? Why?

We would appreciate a general assessment of the entire process, specifying which elements or components you would highlight.

SESSION GROUP REFLECTION No.

(use as many pages as you need)

Date:

Attendance

Discipline dialogue in primary teacher education

the use of science and art on waste management

Genina Calafell, Josep Bonil, Rosa Maria Pujol, and Mariona Espinet

Abstract

The case study included presents an action research project undertaken by university teacher trainers within the context of a science education course for primary student teachers. The purpose of the research was to explore a dialogue approach between science and art disciplines to deal with ESD issues in teacher education. Student teachers were challenged to develop complex representations on waste management and to design an ESD teaching unit for primary schools on waste management within a social-constructivist framework. The process was organized based on key meaningful questions that promoted the use of both disciplines: art and science. The results of the case study show the dynamics of change during the teaching of the course for the role of both art and science. In addition the results also show that student teachers' representations on waste management evolved from linearity and decontextualization to complexity and social I.

The context of the proposal

The proposal put forward is set in a university context and is focused on the initial training of primary education teachers. The idea is to consider education for sustainability in two contexts in a simultaneous way: the university in which the future teachers are trained, and compulsory education where their profession will develop.

The university context

In the Spanish university context education for sustainability has taken shape in the last ten years in what is called the university environment. It is a concept which has developed with different concepts and in distinct ways in Spanish universities. Some universities have focused on it by developing structural environmental aspects while some have carried out proposals which go further than the creation of their own studies of the environment.

In 1994 in the Universidad Aut3noma de Barcelona, the rector's team put forward a suggestion to create a vice-rectorate for Environmental Quality and Campus with the aim of incorporating the environmental structure and the development of the environmental

syllabus proposals. The support for this political decision in 1997 in the School of Education Faculty was demonstrated by the creation of the environmental seminar. From then on this seminar defined the concept of the environment as a process of change in the ways of thinking and acting in relationships between people and between the relationships of society and nature. The aim of the seminar was to promote environmental action in the dynamic day-to-day life of the faculty and in the curriculum of the materials which it teaches. The context created meant that, in the year 2000, based on the investigation group COMPLEX belonging to the Science and Mathematics Education Department, innovative and investigative use of the materials by which the subject is taught were promoted. These actions have had the institutional and economical support of different educational administrations.

To educate for sustainability by developing a programme of the university environmental syllabus brings with it the need to examine world phenomena in general without losing sight of the particular contexts. There is a need to understand the way in which complex systemic visions from a variety of disciplines can provide a means to promote the analysis of the causes and effects associated with these disciplines. It is an idea which runs counter to the hyper-specialisation of universities' syllabuses. The majority of such syllabuses normally present a fragmented view of the different aspects of the world that they cover; something which distances the university student from the possibility of collectively creating new ways to feel, think and act to build a more sustainable world.

The area of compulsory education

In Spanish compulsory education, the tradition on behalf of the staff most involved, is to speak about environmental education with a similar meaning to the concept of education for sustainability promoted by UNESCO in the document called Decade of Education for Sustainability. However, educational political laws to incorporate SE in the syllabus have changed according to the governments the country has had.

In 1990, with the Socialist party in power, the LOGSE (General Law for the Education System) was approved and environmental education was recognised as a cross-curricular subject of the compulsory school syllabus. Under this law, educational centres and the staff had the responsibility of finding their own way to integrate it into the syllabus and into the everyday life of the educational centre.

Later in 2003, with the Popular Party in power, the LOCE (Organic Education Quality Law) was approved. A law which dismantled the established syllabus and reverted to the system of the 70's, by promoting an end to cross-curricula work and to environmental education.

The re-election of the socialist government in March 2004 resulted in the LOCE law being replaced by the LOE (Organic Education Law), which went through in 2006. This law, leaning more towards the LOGSE, proposes a synthesis of the earlier laws and in its

framework suggests new material (education for citizens) which makes it possible to consider environmental education in the syllabus.

The intention of the proposal

The proposal tries to incorporate education for sustainability within science education courses. This meant that the training team had to reflect on, and then articulate, a framework that would allow the work with students to develop.

Intentions of the training team

The reflections and initial intentions of the training team were the following:

- In a changing and complex world it is necessary to propose elements which make it possible to gain a better non-reductionist understanding of the phenomena of the world, and to help understand the causes and effects of those phenomena. For this the phenomenon which is studied should be seen in relation and not in isolation.
- Faced with the social and ecological challenges in the world today it is important to create situations within which staff in the future acknowledge the importance of individual and collective action necessary to meet these challenges. This means that the manner in which the phenomenon under consideration is studied should be relevant for the students and significant for the subject taught.
- To move away from a uniform way of thinking which homogenizes and dilutes possibilities, it is essential to value the importance of discussion, negotiation and consensus as necessary elements to go past what appear to be limits and find optimal solutions to the situations which arise. This is best provided by a horizontal management in which the students and staff make themselves responsible for their own roles.
- It is fundamental that the university student be an active agent of their own learning and the decisions taken during it. Therefore, it makes sense to set the investigative action as a teaching and learning strategy in the classroom.
 - The way that environmental questions are posed can sometimes make integrative approaches very difficult to put into practice. Staff and students should seek out such integrative approaches and, by setting the discipline dialogue in the development of the proposal, ways can often be found to do this.
 - In the current syllabus art and science are seen as divergent ways of expression. Ideally, they should be able to be formed into complementary views by using the sort of thought and creativity which it will be necessary for staff in the future to know and develop. Therefore, a way of approaching the phenomenon, the object of the study, can be to establish a dialogue between experimental sciences and the movement of the body.

- o Staff in the future have to learn to utilise tools in order to develop an educational transformation with their students in the compulsory primary school. To do this the evaluation process of the work should establish whether the educational proposal for the primary school succeeded in integrating the student's learning.

After the earlier reflections, it was decided to take the management of solid urban residues as a thematic object of the project. The theme was close and significant to the students who were studying in the faculty and who had opted in their environmental process to tackle the selective collection of residues. Simultaneously, the theme was relevant for the education of sciences given that it would make it possible to work on many aspects at the same time.

Therefore, given the background of the training team, the construction of discipline dialogues were prioritised taking two disciplines to interpret the theme: science and art. The work in the classroom would act to make a sustainable vision of the management of solid urban residues bearing in mind the area of sciences and the expression of the body. From the area of sciences it is possible to enter further into the characteristics of the diverse residues and the chemical changes associated with its possible treatment. From the area for the expression of the body, it is possible to enter further into possible motor skills of the human body, its communicative potential in its visual and auditory dimension. The dialogue of both visions should make possible a better reflection on how citizens undertake waste management and the models of society and consumption underlying citizenship.

ESD teacher education competences

The ESD competences that were developed during the teacher education proposal are shown in fig 1.

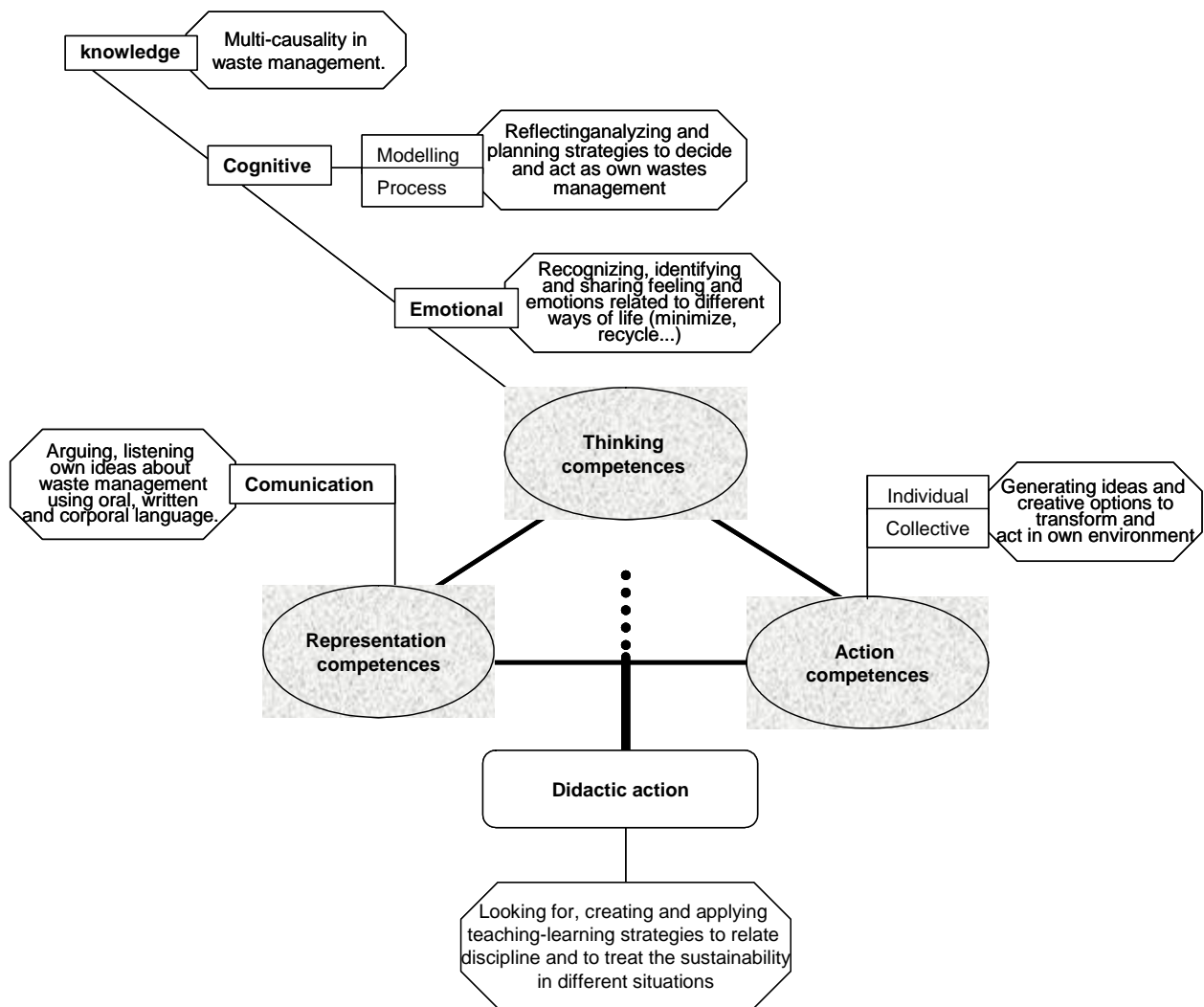


Figure 1: ESD teacher education Competences associated with the proposal

Development of the proposal

The proposal is set in the classroom as an action-research process in which the team of trainers and the students (future teachers) participate. At the same time, the trainers contrasted and analysed that which became apparent in the investigation group COMPLEX in order to plan future interventions with other materials which are taught by the department. The project was developed over the academic year with a total of 90 class hours.

The development was started by giving the students a first working proposal from the trainers. This proposal was re-worked using a participative, dynamic, flexible, successive

and continuous process of research and reflection that included both the students and the trainers.

Contents and organisation

The contents of the work were modified and amplified over the period of the development of the proposal. Some of the established contents in the initial proposal from the team were: inputs and outputs of the material and energy, capacity for medium load, circulation of the material and energy, sustainable and unsustainable systems, the origin and generation of the residues, the properties of the materials, materials and processes of the transformation, the process of the transformation of the residues in tips and treatment plants, the concept and use and value of the objects, the relation between society and the consumption of the residues, the individual and collective management of the residues, reusing and recycling.

The contents of the proposals are organised via educational sequences which were always developed from the initial question. This method aided the establishment of a continuous journey from the object of the study, the work in each of the disciplines (Science and Body expression) and the return to the phenomena in question. Some of the key questions were: are the residues made in classes a problem? From what is the residual container filled every day? Where do the residues the faculty produces come from? Why are the residue containers of the faculty so different? What sensation will you have if you place your hand in the container of the residues? What does it feel like to live next to a tip or incinerator? Will residues disappear in treatment plants and in tips?

Activities and organisation

The changes in the way people think, feel and act require combining teaching activities which promote student teachers' learning in a different way. Over the period of the development of the proposal a series of distinct final activities were developed.

Some of the activities were intended to explore the ideas, values and actions of the participants allowing them to get closer to the objectives and reasons for learning. A second type of activity was aimed at promoting the analysis of new information and new variables via new experiences and observations. These activities were intended to help the exchange of points of view and the language used to express them, and also to make possible the identification of the necessary knowledge to understand the phenomena of the study and the strategic operations that need to be applied to solve it. A third diagram of activities was aimed at synthesizing the new knowledge with the aim of noting the different points of view and the increase in complexity in the analysis of the phenomena of the study. Finally, activities were created so that the new points of view which arose could be applied so as to meet the criteria and allow for an evaluation of what was learnt.

In fig 2 the four diagrams of the activities which were worked on and their organisation within one of the learning sequences is shown below.

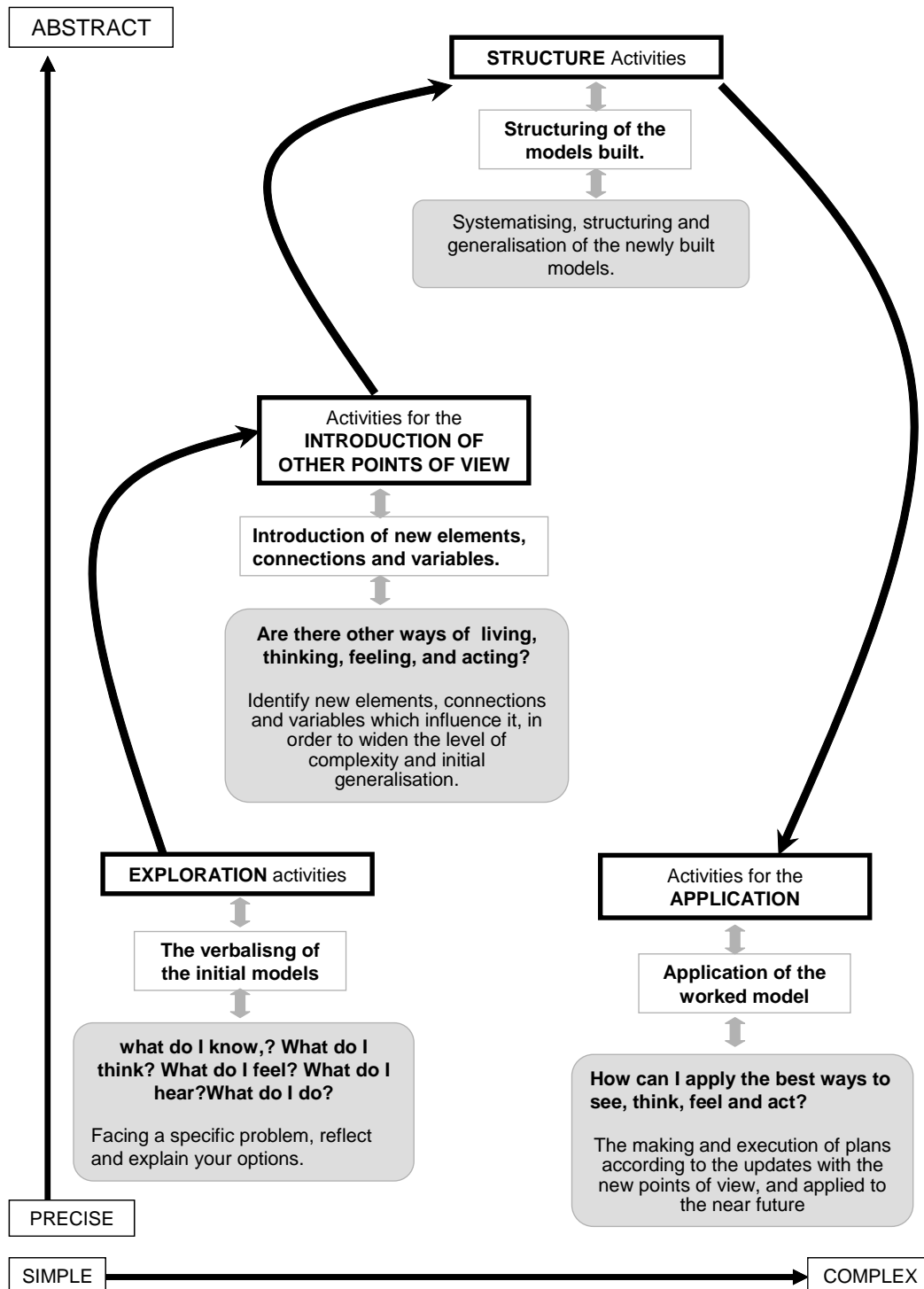


Fig 2. Diagram of the activities worked on

Investigation of the development of the proposal

The proposal developed had two final aims. The first centred in the developmental process of the investigation: action to work with the theme of the solid urban residues using a dialogue between two disciplines. The second centred on verifying the changes that the initial student models gave in order to evaluate the significance of the approach made.

Development and evolution of the action-research process

Analysing the results of the development of a proposal which is subject to a process of constant reformulation brings with it a collection and analysis of continuous data which can be used to guide the next steps.

In order to be able to have a continuous process of reflection on what happens in the classroom it was necessary to produce weekly written observations, reflections, projects and new proposals. It also seemed sensible to produce a video of all the activities that were carried out in the classroom. These were studied weekly and the interesting ideas which appeared enabled the students to make new decisions and find new approaches. At the same time the trainers in the COMPLEX investigation group analysed the management and incidence of learning during the development of the activities. Both contributions generated a continuous reconceptualisation of how to develop the proposal in the classroom and the problems associated with the model of the discipline dialogue between experimental sciences and the expression of the body.

Changes in the student models

To check how the development of the proposal helped to evolve the student models, an initial conceptual diagram was developed and used by the students. In this they wrote down all the words associated with the residues and their problems, and established the links between them. The contents of these diagrams were compared with the contents of the written document which the students made on finishing the proposal and a discussion ensued as to how these associations had been incorporated. This comparison allowed them to see if there has been a significant change and whether if it had something to do with the development of the proposal. Only the trainers were responsible for this part of the investigation.

In the checking process a first level analysis was established to detect whether the students and their writing made any reference or not to fundamental aspects connected with the origin and management of the residues from a sustainability perspective. The results obtained made necessary a second level of analysis that probed further into the relevant changes detected on finishing the the proposal. To do this the final discussions of

the students were analysed using systemic networks (Bliss & Monk & Ogborn, 1983). The results showed the possibility of establishing student profiles differentiated between the first and the second level of analysis making possible a third level of analysis.

Description of the results

Matters regarding the action research process

In fig 3 a diagram of the process of a re-working of the proposal as a result of the action research process is shown. The diagram shows some of the more important I that were taken, some of the reflections that came about and the changes that resulted from the reflection process.

On the one hand some of the decisions had to do with the quantity of teaching sequences initially provided. In consequence, new activities were designed so that the number of total activities were increased (See green circles in figure 3). On the other hand some decisions had to do with more qualitative changes in the way the activities were planned. As a consequence the activities were reformulated (Changes in circle numbers in figure 3). The changes in both the didactical sequences and the re-formulation of activities created a scenario for discipline dialogue between science and art. Within this teacher training scenario knowledge and competences coming from art and science were articulated in new ways.

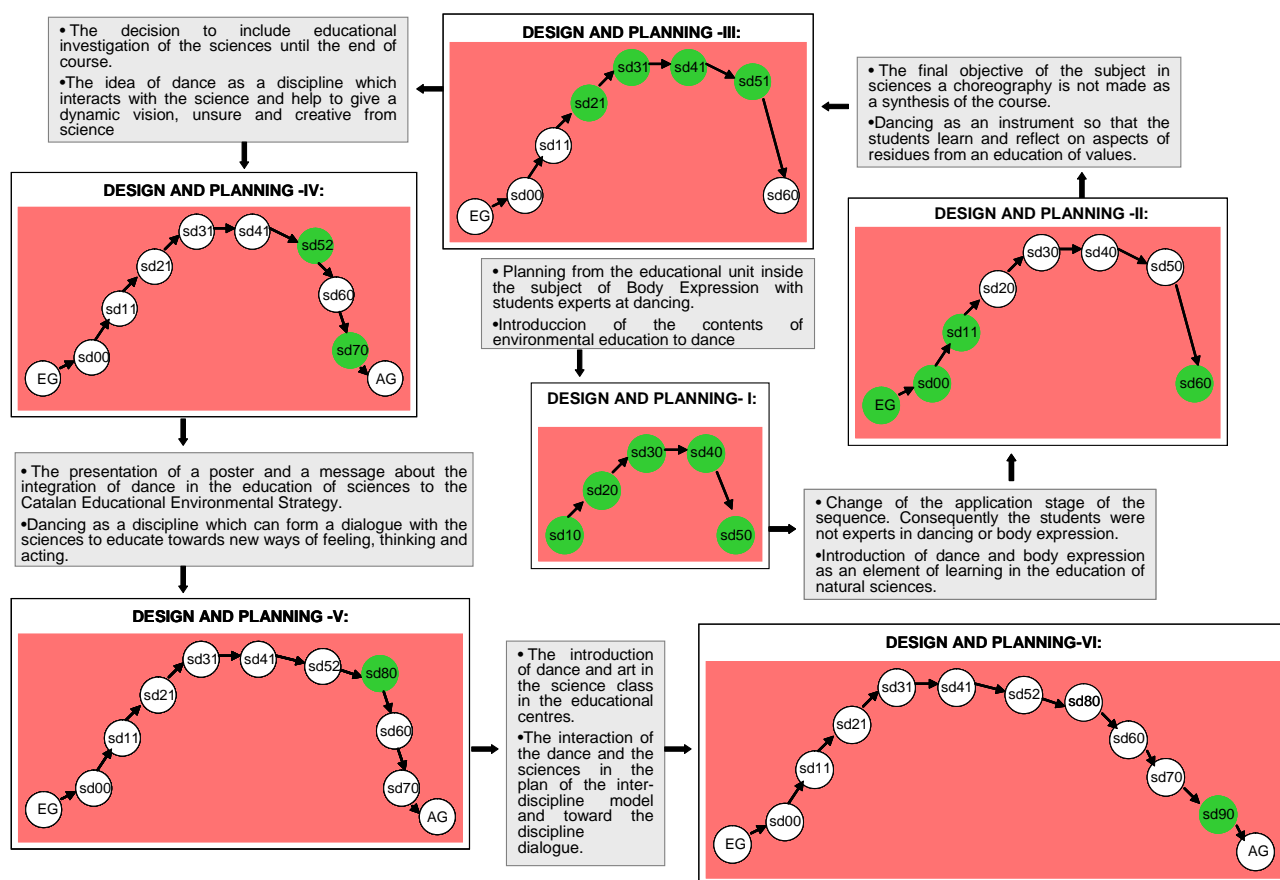


Fig 3. Diagram of the changes undertaken during the action research process

Matters concerning the student models

If at the start the student models showed linear connections of cause and effect (“recycling does not take place and so there are residues”). Later, it was seen how more divergent and complex models of the environmental phenomena were possible using connections that had multiple causes and effects.

At the start, the students held global environmental views which were decontextualised from the social, economic, and political model, which generated vision of the residue problem and without any acknowledgement of responsibility for it. After the work was carried out the students made much more complex interpretations of the residue problem which integrated the importance of critical and reflective thinking about a consumer society, the importance of a individual responsibility in the origin and production of residues, and the importance of shared responsibility between the different agents who make up society.

For reasons of space only some examples of the work are made explicit, those which refer to the student models about the origin and making of the residues.

The first level of analysis showed that, initially, the students noted very few connections between the type: “environment - construction - usefulness - expiry date - residue”, while in the end the work made explicit the connections between the origin of the residues, the characteristics of the society and the behaviour of the people. Therefore, expressions such as, “(...) *the importance that residues have nowadays, now that we live in a consumer society and in a day we use many products and therefore every individual creates a very high quantity of residues*”, were much more frequent in the final document.

Comments such as, “*we make large amounts of unnecessary residues*”, “*we make a lot of residues in a limited time*”, “*as many people as we are and with all the daily activities that we do we make a lot of residues*”, were only found at the end of the work.

In the second level of analysis it was noted that few students made reference in a correct and complete way to the origin of the residues. On finishing the development of the proposal a large majority connected the origin of the residues with the consumer society, and were able to state that humanity transforms the environment and develops environmental problems such as residues thus making connections between individual and citizen behaviour and the origin of the residues.

In commenting, at the end of the developed proposal, on the I for the making of residues, the students noted the significant responsibility of citizens and referred to it as unnecessary and/or irresponsible. Some of the students made connections between their daily activities and/or the diversity of residues such as its accumulation in certain places.

In the third level of analysis it was possible to identify student profiles which represented groups of opinions. The profiles were identified and their singular characteristics were:

- *Independent profile*: they speak about the origin of the residues all the time and the making of them later. Their opinion never coincides with the rest of their colleagues.
- “*Consumer*” *profile*: they always speak about the origin of the residues. Initially, they form an incomplete origin of them (the organic material). Later they speak about the connection between the consumer society and the origin of residues, specifically saying that the making of residues is high and comes from everyday activities.
- *Consumer profile*: in the beginning they do not speak about the origin of the residues. At the end of the proposal they make connections between society and the origin of residues stating that they are high and stem from daily activities.
- *Local-Global profile*: initially they do not speak about the origin and the making of them. Later they establish humanity as the cause of the origin of the residues and that daily activities unconsciously create a high amount of residues.
- *Forgetful profile*: initially they speak about the origin of residues but not of the making of them. Later they do not speak either of the origin or the making of them.
- *No problem profile*: Neither at the start of the work nor at the end do they make explicit anything about the origin or the making of residues.

- *Revolutionary profile*: Initially they do not speak about the origin nor the making of residues. Later they do speak about both aspects.

Analysis of the results

The data obtained in the development of a work proposal under the model of action-research, sets out the discipline dialogue between sciences and the expression of the body in tackling a topic such as the urban solid residues from the perspective of sustainability and made it possible to say that:

- Environmental phenomena are excellent for creating areas for discipline dialogue. They also make possible an integration in the classroom of key aspects of society which help to educate the student into being a member of that society, and at the same time provide coverage of large elements of the syllabus.
- Establishing a discipline dialogue entails a continuous challenge to create spaces of interaction and to face uncertainties. These spaces do not exist unless they are created by management of the teaching-learning processes.
- Establishing a discipline dialogue favours the non-hierarchy of the disciplines yet at the same time this enriches the development of the science subject.
- The dialogue between sciences and the expression of the body supposes the opening of a path to help the student feel, think and act from a complex perspective.
- This dialogue promotes the creativity of the student from the perspective of a world in which it is possible to creatively modify the rules of the game in order to invent and create a future which is more balanced and sustainable.
- The discipline dialogue emotionally develops stimulants in which a constant social interaction is possible between the students including the sharing of feelings and emotions. All of this favours changes in the models on the subject of residues.
- The atmosphere in the class which is created on establishing the discipline dialogue between student and trainer helps students be active agents in the design of the proposal and thus promoting greater involvement.
- Establishing a dialogue between the disciplines brings with it a continuous re-organisation of the syllabus and the activities in the classroom.
- The situations of the discipline dialogue help the students to integrate a larger number of dimensions into the explication of the phenomena, aiming towards a dynamic vision of the management of the residues.
- The situations of the discipline dialogue help the students become more conscious of the consumer society as the root of the problem of the residues, to see the individual and collective responsibility of the phenomena and develop their critical and reflective capacity towards the management of the residues.
- The discipline dialogue helps to reshape the subject of the residues from a scientific perspective and to find new ways to represent the characteristics of the materials

and changes associated with its treatment: it helps that the students take into account the integration from the start of the transformation of the management of the residues.

Pointers to the future

The investigation indicates the need for continuing investigating models of inter-disciplinary relations:

- The importance of deepening discipline dialogue in contraposition with transdiscipline and interdiscipline.
- The need to design educational units and plan the training of the staff for dialogue discipline between science, art and other disciplines.

Some useful resources


Body expression activities

Moving like materials such as paper, plastic etc. allows the students to experience some characteristics of the materials which make up the residues and identify some of their properties (elasticity, durability, flexibility)

The movement and expression of the body creates analogues of the processes such as the combustion of the materials or the origin of the residues. It also is used to represent and regulate the student models

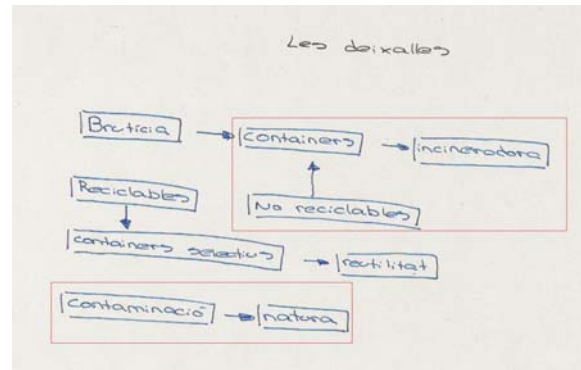
Representing the transformation of the material during the residual treatment process



<p>Experimental Science Activities</p> <p>The formulation of the questions and the hypothesis to develop an experimental observation or project were important activities to check the properties of the materials which make up part of the urban solid residues and see their possible reuse and recycling</p> <p>The conclusions made possible connections between the value of the use and the need, between consumption as an individual and collective act, between individual and collective action on the residues</p>	 <p>A laboratory activity to analyse the materials of a residue container of the faculty</p>
<p>Conversation during a trip out of the classroom to get to know the place of the x of residues</p>	<p>Conversation Activities</p> <p>The continuous dialogue between all of the participants of the classroom helped the interpretation of the phenomena from diverse points of view. It was crucial to negotiate decisions and reach a decision</p> <p>The conversation was also essential to set up a discipline dialogue between experimental sciences and the expression of the body</p>
<p>Group work Activities</p> <p>The group work aided the negotiation and dialogue between individual and collective student x capacities</p> <p>The management of the group using dynamic participation was essential to create situations which stimulate the emotions and the connections between the students</p>	

Learning regulation Activities

The ongoing forming of the written material by the students made up one key element for the constant regulation of their learning. The results of the analysis of their contents were important in taking decisions to advance the work. Conceptual diagrams and argumentative texts were two-directional regulation mechanisms between the students and staff



Initial students' conceptual diagram

Action activities of the people

Linking the students to what happens in university life makes it possible to become conscious of the importance of action in its own context. It also helps to see the importance and the possibility of action in the development of their profession as primary education teachers



The CD Ambit created as an instrument to make people aware the environment of the Science Education Faculty was the starting point to work on waste management from action on the environment

North – South Relationship: Past – Present – What Future?

Case study Pädagogische Hochschule Zürich (PHZH)

A Teacher Training - Module

Barbara Gugerli-Dolder



North – South Relationship: Past – Present – What Future?

Context of the case study

Situation in Switzerland

In Switzerland ESD in teacher training is not yet established on a large scale. There exists a platform, however, with representatives of five federal departments and the conference of the cantonal education directors (EDK). For years the EDK has had a general focus on ESD, from the three viewpoints of environmental education, global education and health promotion.

With the new action plan for the UN Decade for ESD 2007 - 2014 (www.edk.ch > Tätigkeitsbereiche > Bildung für Nachhaltige Entwicklung) developments in fostering ESD are expected.

At this point we should also mention that continuing education in Switzerland is not compulsory for teachers – with a few exceptions. In consequence, due to the lack of applications many of the courses and modules offered fail to take place. EE and ESD seem to be especially affected.

Situation of ESD at the PHZH

Ever since the beginning of the PHZH, there has been an important movement to introduce ESD at our institution, started by different lecturers in various departments and subjects (research and development, teacher training, in-service teacher training and the workgroup “Ecology at PHZH”); however, no general ESD project has so far been launched by the school board. Therefore a co-ordinating structure does not exist. An overview of the different activities is presented below.

Overview of ESD-activities in our institution

- *Research and innovation*

Our institution has a research focus on the school as a place for experiences of life and relationships. There are three strands in this project concerning ESD: environmental education and education for sustainable development; social integration and equal opportunity; and prevention and health promotion in schools.

Various research and development projects concerning (aspects of) ESD: Curriculum development in ESD for 9th grade (national), competencies in ESD (PHZH), didactics of systems thinking (international), integral concept for environmental education (national).

Workshop on ESD at the research day in 2005.

The first annual academic report of PHZH presented at the workshop above focused on education, society and sustainability (download: www.phzh.ch/content,207,r,_Dz.html).

One issue of the PHZH journal “ph-akzente” was devoted to ESD.

- *Undergraduate & Graduate Studies*

Some modules in geography, history, environmental education, for example, include ESD aspects (Ph-akzente Nr. 3/2005: “Bildung für eine nachhaltige Entwicklung” (download: www.phzh.ch/content,208,r,_Dz.html))

- *Post graduate studies & professional development*

Short courses; post graduate studies: learning about sustainability - ecology: with selection option module on ESD; coaching school teams in environmental education projects as an approach to ESD (little demand in all offers).

- *Administration*

Institutional commissions: Working group “Ecology at the institution PHZH” and commissions on health promotion and gender questions.

- *Signatory of Copernicus-Charter* (December 2007)

We expect some pressure from the federal program on ESD for the UN Decade as listed above. So far the Canton of Zurich has not responded to this program.

Selection of the case study

During the period of this research project, I unfortunately had no opportunity to teach a module or course myself, due to the lack of applications and some structural reasons.

Through private funding, it was possible to develop a postgraduate course in our institution: “Learning about sustainability – ecology” with six compulsory and three option modules focusing on the ecological aspect of ESD. One of the option modules was specifically on ESD: “Live your visions: Creating the future with children and youth”. As far as we know, it was the first module of this kind offered in Switzerland.

Despite advertising the course in several different ways, there were not enough applicants either for the postgraduate course or the option module.

Our module on environmental education in teacher training, which has a focus on ESD, could not be offered during this period for structural reasons.

Therefore the only possibility was for me to evaluate a module of a colleague. I selected a history module focusing on global education and ESD: “North - South Relationships: Past - Present - What Future?” This is the only module that specifically and explicitly focused on ESD at our institution. For me this module was especially interesting, as, unlike my own work, it does not derive from an ecological or environmental background.

The goal of the evaluation was:

- To look at the preconceptions of students in the field of ESD, as well as at the sources of their knowledge. This should help with development of future teacher training concepts in ESD.
- To get information on how students relate to the competency areas of our model.
- To learn about the module’s effect on students’ attitude toward teaching ESD.
- To improve the quality of the current module.
- To show an example of how ESD is already taking place in our institution.

The training for a secondary teacher lasts 8 semesters. The students normally select their profile with five different subjects. They attend five different kinds of practice placements: 1st semester: one day weekly for orientation; following semesters: three blocks of three weeks each in a school, one subject oriented placement for one morning

per week, one placement as a substitute teacher, and one special practice placement (special school, boarding school, industry).

The selected module is compulsory for all teacher training students for secondary school level I (grades 7 to 9) who choose history as a teaching subject. The module consists of 14 weekly sessions of two lessons each and earns 1,5 ECTS.

The history part of the training consists of 13 modules, including the one this case study focuses on. In addition, the students have a practice placement for teaching one of the selected subjects of their choice.

A new model of training for a secondary teacher is in the process of being implemented.

Intention of the Module

Goals of the module

Students:

- are introduced to the historical roots of worldwide inequalities, as well as to the actual impacts of the globalised world economy and world society;
- learn the concept of sustainable development (Agenda 21) and various attempts to implement this international guiding principle for the 21st century;
- engage in the possibilities and limits of ESD, and what is asked of it according to the directions of Agenda 21.

These goals mentioned in the description of the module only refer to the process.

According to the lecturer, the following output goals (competencies) were aimed for (not mentioned in the advertisement):

- Students are personally touched by the topics and sensitized toward worldwide injustice as well as ecological problems;
- Students deal with their own attitudes;
- Students are familiar with appropriate concepts and teaching materials, as well as knowing about further sources should they want to plan teaching activities in ESD.

Teacher education in our institution has to be focused on ten specific standards, which were defined by PHZH with the help of a model from Canada (see also: <http://www.phzh.ch/>, Ausbildung).

This module refers to the following two standards:

- *Standard I: Knowledge of subject areas and application of this knowledge; awareness of educational theory*
The teacher understands the central concepts, tools of enquiry and structures of the subject(s) he or she teaches, and is aware of the relevant developments in educational theory. He or she understands how pupils acquire knowledge and skills, and can create learning experiences to foster such acquisition. These learning experiences enable pupils to understand the world in which they live, to communicate about it, and to take part in shaping and creating it.
- *Standard X: The school as an organisation within the larger social context*
The teacher is aware that the school actively reflects conflicts that arise from contradictory priorities of culture, society, democracy, the economy and ecology. He or she understands the importance of legal and ethical standards, their historical context and ecological implications; the teacher realises that schools are part of a dynamic system in which all parts of society are involved, and orients his or her professional activity accordingly. He or she understands that the transformation of schools is part of broader social change, and is concerned to foster co-operation between different interest groups within the social system.

Lecturer:

Dr. Franziska Gerster, lecturer PHZH, and participant of the national research and development project “Curriculum development in ESD for 9th grade”.

The elements of the CSCT-model were represented in structure of the module according the lecturer as indicated below:

Elements	Rating: λ = low $\lambda \lambda \lambda$ = high
Teacher as an individual	$\lambda \lambda$
Teacher in the institution	$\lambda \lambda$
Teacher in society	$\lambda \lambda$
Reflecting, visioning	$\lambda \lambda$
Teaching practice	$\lambda \lambda \lambda$
Networking	λ
Knowledge	$\lambda \lambda \lambda$
Systems thinking / complexity	$\lambda \lambda$
Emotion	$\lambda \lambda$
Values	$\lambda \lambda$
Action	$\lambda \lambda \lambda$

Content of the Module

The module was composed of two parts: the first part focused on the relationship between North and South in the past and present. The second part dealt with the future: sustainable development and education for sustainable development in the context of the relationship between North and South.

The main topics were:

1st part: North - South -relationship (past - present - future)

- Families in countries of the North and of the South.
- North - South encounters: European expansion - the example of the conquest of America.
- Roots of underdevelopment: different starting conditions of the different continents, going as far back as the Ice Age (theory of Jared Diamond).
- Paths to underdevelopment - From colonialism to globalisation. Example: history of Bolivia.
The trap of indebtedness.
Globalisation and its consequences.

2nd part: Sustainable development and ESD

- Concept of “sustainable development” (Conference of Rio, Agenda 21). Attempts to implement of this concept:
 - From development aid to development co-operation.
 - Different innovative initiatives for a sustainable development.
- Campaigns and lobbying of NGOs on the policy level.
- Education for sustainable development:
 - Teaching Materials.
 - Examples of teaching projects:
 - Living space “school” as a model learning site.
 - Value clarification.
 - Global Learning with the example of clothing.
 - Teaching on, and in the spirit of, human and children’s rights.
- Evaluation of the course.

Teaching Methods

First of all, the form of the module (14 sessions of two lessons each) limits the possibility of visiting learning sites or doing longer process work. But compared with a seminar of just

a single week, it allows a relationship with the students to be built up over a longer period of time. The lecturer wishes that - if there were more time in future - the topic of the module could be additionally explored by the students through practical work in a school, with a discussion of the results following from this.

A basic problem in dealing with the topic is that students, as well as the society, have stereotypes -- mainly communicated by mass media -- about third world countries, and these are difficult to change: “Krise, Kriege, Katastrophen” (Crisis, wars, catastrophes)

The following ranking list shows the different methods and how often they were used.

Methods used: students were ...	Rating
<ul style="list-style-type: none"> • Listening to lectures 	Main elements
<ul style="list-style-type: none"> • Working in groups with information materials: e. g., extracting the basic content of a text (such as J. Diamond) or individual preparation using internet investigation for processing information in a group that would also use print materials. Preparing a summary with a given structure 	
<ul style="list-style-type: none"> • Presenting group work 	
<ul style="list-style-type: none"> • Role playing (podium) on current controversial political issues 	Double lectures
<ul style="list-style-type: none"> • Having a direct encounter with a representative of an NGO (developmental politics) 	
<ul style="list-style-type: none"> • Experiencing, with the concrete everyday example “clothes”, how it is possible to make visible the link between complex global interrelations and local issues 	Methodological elements
<ul style="list-style-type: none"> • Free association based on looking at photographs 	
<ul style="list-style-type: none"> • Bringing in their own experiences with other countries and cultures 	
<ul style="list-style-type: none"> • Interpreting photographs: figuring out context and background information 	
<ul style="list-style-type: none"> • Watching movies with specific observation tasks 	
<ul style="list-style-type: none"> • Filling out a questionnaire on a specific issue (e. g. clothing) 	
<ul style="list-style-type: none"> • Trying out methods of value clarification (similar to baker’s dozen), e. g., in regard to human rights, children’s rights 	
<ul style="list-style-type: none"> • Being introduced to teaching materials, partly with doing activities 1:1 	
<ul style="list-style-type: none"> • Being presented with different sources for appropriate teaching material 	

Research questions

- What are the preconceptions of the students concerning different ESD terms, and where do they get the information?
- What is the student interest level concerning the topic N-S and ESD in regard to teaching it?
- What are the expectations of students concerning the module?
- Are their signs and indications that tell us more about the competencies the students bring with them (referring to the domains we used in our concept)?
- Did the module change anything regarding the competencies of the students?
- After the module, what were the students' conceptions concerning different terms of the field of ESD?
- How do the students look at their own lifestyles regarding SD?
- What modifications could be made in the module for the next semester?
- What are some general conclusions for ESD in teacher education?

Methods

Questionnaire

Two questionnaires were developed: one for the beginning of the course and one for the end (see annex). About half of the questions were closed, all the others could be answered with key words or sentences.

Pre-test: The first questionnaire included general information about the student, his or her interest in the topic, as well as expectations concerning the module. A second part asked for definitions of the terms “environmental education”, “global education”, “agenda 21” and “education for sustainable development” to investigate the preconceptions of the students. We also explored the sources of information. A third part referred to the groups of CSCT-competencies. At the end we tried to investigate the lifestyle of the students, and to some extent that of their parents. The questionnaire was handed out to the students after the second session to fill out at home. Unfortunately there was not enough time to do it in class, which would have been better.

Post-test: The second questionnaire started with an evaluation of the module. The definition of the specific terms and the investigation on the competencies remained the same as well as most of the lifestyle questions.

Observation: I attended four sessions of the module and took notes.

I had several discussions and conducted short interviews with the lecturer.

The *DVD report* was filmed a semester later with another group of students and I recorded three different sessions. The program of the module remained the same. After each session I had a short interview with two to three students from the class.

Description of the empirical data

Two groups of students (13 and 17 members) who attended the module were investigated: Group 1, 13:15 - 15:00; Group 2, 15:15 --17:00 the same afternoon.

All 30 students responded to the first questionnaire, 19 female and 11 male students. 23 answered the second questionnaire (14 female, 9 male). For organizational reasons the student-teachers filled out the first questionnaire at home after the first session.

The second questionnaire was to be filled out at the end of the module in class. Unfortunately 12 students were missing because they had other exams at the same time, or were under intense pressure as it was the end of the term. Five students sent back the questionnaire after the summer break. Seven questionnaires are missing.

Generally the module was packed with activity up to the last minute, and there was very little time for evaluation.

A summary of the results of the questionnaire follows.

Motivation of the students

Most students were highly motivated to learn more about North – South relationships as well as teaching-units/-projects for ESD (Ø 4,6 of 5 points) and to integrate these topics in their teaching (Ø 4.5 of 5 points). This has not significantly changed after the module (Ø 4,3 and 4,2).

Motivation

The following chart shows the summary of answers to the open questions:

Before the module (30 students total)	answers	After the module (23 students total)	answers
Teaching, total	14	Teaching, total	18

Interest of teacher in the topic	7	Relationship to everyday life	5
Interest of student in the topic	4	Teachers interest, competence	3
Teaching Methods	1	Inter-disciplinarity	3
Inter-disciplinary work	1	Exciting topic	2
Diversification in teaching	1	Good teaching materials	2
		Excellent Organizations/NGOs	2
		Fun doing something new	1
Society, surrounding field, total	34	Society, surrounding field, total	19
Topicality	14	Sustainable development, LA21 import.	9
Classes with intercultural background	6	Environment, climate protection	4
Globalization	4	Topicality	3
N-S-relationship is important	3	N-S-conflict	2
Media presence	2	Active Firms	1
Confrontation on travels	2		
Racism-prevention	1		
General education	1		
Sustainability	1		
Specific interests/competencies, total	36	Specific interests/competencies, total	28
Insight in other forms/cultures of life	7	Looking from different perspectives	6
Acting, looking for solutions	6	Connections, back-grounds, problems	4
Fostering awareness for the topic	6	Fostering empathy	4
Consequences of own actions	4	Relationship to future, acting competence	3

Systemic thinking, connections	3	Fostering awareness, sensitization	3
Enhancing solidarity	2	Improvements, own behaviour	2
Realization of conflicts/nuisance	2	Globalization, connected World	2
Fostering critical thinking	1	Global learning as core-competence	2
Forming opinions (students)	1	Insight into other forms/cultures of life	1
Migration historically	1	Reducing prejudices towards students	1
Shaping the future	1		
Worldview	1		
Passing on a true image of the world	1		

Hindering reasons

The following chart shows the summary of answers to the open questions:

Before the module (30 students total)	Answers	After the module (23 students total)	Answers
Teacher related, pedagogic reasons, total	27	Teacher related, pedagogic areas., total	31
Lack of time	8	Danger of proselytizing/moralizing	9
Difficult to select from abundant topics	5	Lack of time	6
Lack of good teaching materials	3	Not clear if students want to deal with topic	3
A lot of work to acquire knowledge	3	Focus lies too much on problems	2
Uninterested students, far away from students	3	Lot of work to prepare	2
Fear of proselytizing/moralizing	1	Difficult to select from abundant topics	2
Too difficult for students, excessive		Students of these countries feel affected	2

demand		Delicate topic	1
Always the same things	1	Far away from student-life	1
		Success is not visible for the teacher	1
		Too much lecturing	1
Society, surrounding field, total	1	Society, surrounding field, total	4
Political reasons	1	Other disturbing influences (media, parents)	1
		Stubbornness of certain people	1
		Too much information through the media	1
		Lack of acting possibilities	1
Lacking competencies, total	35	Lacking competencies, total	13
Complexity	9	Danger that stereotypes remain (students)	4
Lack of basic knowledge	8	Complexity, difficulties in understanding	2
Helplessness, powerlessness	5	Helplessness, powerlessness	3
Intercultural classes, difficult to be value-free	5	How to explain to students to shop „fairly“?	1
Conflicts with students, difficult topics	3	None lacking	1
No reason, no problems, not my problem	3	I am not discouraged	1
Stereotypes as a problem	2	How to explain the real state of the earth	1
Depressed sentiments in the classroom	2		
Students learn something but cannot change it	1		
Personal consternation is too big	1		
Not able to do change of perspectives	1		

Expectations of the module and how they were fulfilled

The following chart shows the summary of answers to the open questions in comparing the first and the second questionnaire. It was sometimes difficult to find matching statements from the first and the second questionnaire - therefore the comparison is approximate.

Expectations	Number of statements	Fulfilled expectations	Number of statements
Didactics/methodology, references to what is interesting for students	15	Didactics/methodology, knowing how to inspire the class, exciting contents	15
Understanding the N - S - Problem, specific conflicts	15	Understanding the N - S - Problem	3
Expertise: Increasing expert knowledge	11	Introduction to many topics	1
Topicality/action: Introduction to current campaigns, projects, solutions	7	Topicality/action: Introduction to current successful projects and organisations	5
Didactics of the module: meaningful efficiency statement, change to the usual modules, exciting arrangement of the module, being active and bringing in own experiences	6	(No statements)	
Teaching Materials: Introduction to teaching materials, analysing and producing teaching materials	5	Teaching Materials: Comprehensive, new teaching materials, summaries	10

Complexity: Identification of connections (economic-historic) correct information without simplifications	4	Complexity: Global understanding of global problems, global education	3
Emotions: Learning how to deal with helplessness and depressed moods in class	4	(No statements)	
Exemplary teaching	2	(No statements)	
Reflecting openness, attitudes; fostering understanding	2	(No statements)	
(No statements)		Knowing how to get information	1
SD: Introduction to Agenda 21	1	SD: Problems (sustainability, politics) identified	1
Insight into different lifestyles	1	Information about other cultures	1
Total	73 statements out of 30 students		40 statements out of 23 students

Answers to specific questions

What did you miss in the module:

Items mentioned by more than one person:

- 3 students missed student-oriented activities;
- 2 students wanted more statistics, numbers.

Proposals and suggestions of the students:

- 6 students would have liked to stay longer with one topic and look at it in depth;
- 2 enjoyed the visit of a member of an NGO and suggested that it be included again.

Suitability for ESD in secondary schools and for teacher training:

- All students found the topic very suitable or suitable to teach ESD in secondary schools and for teacher training (both \bar{x} 4,6 of 5 points).

What was the most important message you got through this module?

5 students mentioned the importance of sustainable development:

- Sustainable development should be a fixed part of the curriculum.
- Sustainable development is one of the most important issues.
- Examples of how sustainable development can be realized.
- Sustainability.
- (Global education) Sustainable development.

2 students focused specifically on global learning:

- Global education.
- That global education exists and that one should teach it.

13 students mentioned specific insights or attitudes (not judging all the time, everybody can do something ...):

- Not evaluating, but rather showing interest and looking at different perspectives.
- Everybody has the opportunity to contribute to the common good.
- Everybody can have influence.
- The goods are extremely inequitably distributed in the world, and it is worthwhile to do something about that.
- I very much liked the input of the man from EvB (NGO) as I didn't know this organization.
- I don't do much to create a better world, and therefore I am a bad human being.
- Only if you know where the problems and disparity lie, are you able to act and look for solutions.
- The content of the module was positive, but opened up a lot of questions too, to which we don't know the answers. How do I deal with that? How do the students deal with that? It is difficult to find a good way.

- As a teacher I have the responsibility to call to (students’) attention inequities and injustice.
- Not moralizing.
- The topic N-S relationships will have its place in my teaching.
- NGOs, no stereotypes.

Pre-concept / post-concept: Definition of the terms

Origin of knowledge

The following chart shows where students got their impressions of the four terms: sustainable development, agenda 21, global learning and environmental education. Multiple naming was possible. In the column “other” most answers referred to the family.

Where from do you know the following terms?	High school	PHZH	Media	Other	Don't know the term
Sustainable development	8 27%	7 23 %	15 50%	2 7%	3 10%
Agenda 21	1 3%	4 13%	9 30%	1 3%	18 60%
Global learning	4 13%	12 40%	8 27%	4 13%	7 23%
Environmental education	5 17%	8 27%	12 40%	8 27%	4 13%

Definitions

The students’ definitions were rated according to some basic contents (see examples below). Each of the listed basics merited one point (4 points was the maximum).

Sometimes the allocation, and in consequence the rating, was very difficult. Therefore the data is pretty approximate.

Basic contents:

Sustainable development:

- Long-term development, future generations.
- Aspects: ecology, economy, society (retinity).
- Quality of life, basic needs of humans.
- Dealing with resources.

Agenda 21:

- International action program/plan.
- Sustainable development.
- Signed by many different countries.
- 21st century, Rio 1992.

Global learning:

- Goal: a world of greater justice, equity and human rights for all (ethical principles).
- Sense of responsibility for world-wide correlations, globalization.
- Acquiring competencies to cope with complexity, wealth of knowledge.
- Competencies in switching perspectives, empathy, solidarity.

Environmental education:

- Ecological/environmental problems to solve, environmental quality.
- Knowledge, understanding of coherence.
- Awareness, relationship, values, ethics.
- Behaviour, taking action.

The chart below shows, that the post-concept understanding of the four terms was about twice as accurate as the pre-concept understanding, however students only reached about half of the possible points. Agenda 21 was the term the students were mostly unfamiliar with, which is also shown in the chart above. At the end of the course the difference between the four terms was pretty small.

Remark: during the module the teacher didn't emphasize the definition of the terms and environmental education was not part of the content

Terms	1st questionnaire	2 nd questionnaire
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	(max. 4 points)	(max. 4 points)
Sustainable development	Ø = 0,8 points	Ø = 1,9 points
Agenda 21	Ø = 0,4 points	Ø = 2,1 points
Global learning	Ø = 1,0 points	Ø = 2,2 points
Environmental education	Ø = 1,1 points	Ø = 1,8 points

Some examples of conceptual change regarding ESD during the module:

Sustainable development:

- Q. 1 “Development that will be guaranteed medium-term and long-term” - 1 point.
- Q. 2 “Development that considers different aspects: society, economy, ecology” - 2 points.

Environmental education:

- Q. 1 “Educate students to be careful with the environment, e. g. separate waste” - 1 point.
- Q. 2 “Show students how we damage the environment today, show alternatives to improve the situation, conveying values.” - 3 points.

Examples of persistent pre-concepts or backsliding after the module:

Agenda 21:

- Q. 1 “ Education that is politically, economically and socially correct” - 1 point.
- Q. 2 “Problems and topics that are pending in the 21st century” - 1 point.

Global education:

- Q. 1 “To learn from globalization. Not to be fixated on one’s own country and life.” - 2 points.
- Q. 2 “To learn from others in the world, from their successes and their mistakes” - 1 point.

Competencies

Competency (detailed description of the five competencies see questionnaire in the appendix)	Difference between general importance and personal competency (indicator for need of improvement) Questionnaire 1	Difference between general importance and personal competency (indicator for need of improvement) Questionnaire 2	Difference between questionnaire 1 and 2 (indicator for improvement of competencies)
Factual knowledge	$\emptyset = 1,2$	$\emptyset = 0.57$	0.63
Dealing with complexity	$\emptyset = 1,2$	$\emptyset = 0,74$	0.46
Acting in school	$\emptyset = 0,80$	$\emptyset = 0,65$	0,15
Emotional competencies	$\emptyset = 0.50$	$\emptyset = 0.26$	0,24
Ethical competencies	$\emptyset = 0.53$	$\emptyset = 0.17$	0.36

Results of the recorded interviews/discussions after three sessions (different students, one semester later):

Proposed competences for teaching ESD

- Knowledge about the world, overview, personal experience.
- Ability to see different perspectives, to change perspectives, to realize connections and to know that there are no absolutely correct solutions, global networked thinking, seeing consequences and knowing methods to animate pupils' thinking in these ways.
- Authenticity, credibility.
- Conviction, to set a good example (e.g. with selection of products) and the ability to demonstrate the development process.
- A willingness to accept the values of children and discuss those values with them.
- To be able to select a topic to which the pupils can relate, not to moralize but to give hope.

- Create awareness by bringing up and dealing with appropriate topics.
- Knowing methods to help students to use their knowledge and awareness for acting.
- Ability to think about economics (missing with most teachers).
- Ability to cope with suffering, not accusing and moralizing but also maintaining objectivity and a certain distance.

Wishes

- Time for interdisciplinary work (e.g. project-week).
- Efficient co-operation and co-ordination between teachers of different disciplines.

Lifestyle

Perception of their own lifestyle

How do you judge your personal / general lifestyle in the following realms (maximum 5 Points)	Before module		Diffe- rence	After the module		Diffe- rence
	Pers. / desired	Ø		Pers. / desired	Ø	
Environmental action (e. g. consumption, mobility)	3.9	4,4	-0.5	3,6	4.6	-1,0
Socially sound goods and services, fair trade (e. g. clothing, holidays)	3.5	4,3	-0.8	3,4	4,2	-0,8
Social engagement	3.8	4,4	-0.6	3,9	4,5	-0,6
Political engagement	2.9	3,6	-0.7	2,9	3,9	-1.0
Personal relationship with nature	4	4	0	4,2	3,9	+0.3
Dealing carefully with yourself and other human beings	4.4	4,7	-0.3	4,5	4,7	-0.2

Memberships (NGOs, Institutions etc. working with aspects of ESD)

12 students had membership of 24 different groups (e.g. 6 Greenpeace and 3 WWF memberships) and 17 parents had membership of 28 groups (e.g. 8 Greenpeace, 10 WWF). 7 Parents were members of groups while their children (students) were not but only 3 students were members when their parents were not. In 8 cases parents and their children (students) both had one to several memberships. A clear relationship between membership and the estimations of lifestyle could not be identified. Two Parents with membership of several groups also had children (students) who were members of several groups.

Analysis of the Data

General remark: As we didn't test a control group without experience of the module, we cannot say with certainty that all the noticeable changes were the result of this module.

Motivation

According to the students, high motivation for teaching the topic (worldwide N-S-relationships and sustainable development) before the module was based mainly on their own interests and the assumed interest of the pupils. During the course of the module, new aspects partly replaced these first reasons: relationship to everyday life, the resources of good teaching materials as well as helpful organizations. The importance of topicality lost importance and sustainable development appeared in the centre. Insight into other forms/cultures of life wasn't mentioned anymore, while looking at issues from different perspectives became a new focal point.

The most important negative reason remained constant: a lack of time. However the students identified a new concern through the module: the danger of moralizing/proselytizing. After the module, complexity and lack of knowledge were not an important negative reason any more.

Expectations

Obviously it is easier for the students to express *expectations*, than to explain how *they have been fulfilled* during the module, as the number of statements answering this question was almost halved in the second questionnaire. Another reason for this result might be the fact that at the end of the term the students were exhausted, due to many exams.

The results show very clearly that expectations concerning didactics and methodology have been fulfilled as expected (15 answers), and that the students took greater profit from the presentation of comprehensive and new teaching materials than they expected (increased

from 5 to 10). To acquire expert knowledge, which was expected by 11 students, was only mentioned by one student at the end. Obviously this goal was not reachable in the rather short teaching span.

It is also amazing that the N-S-topic went out of focus during the module - only three mentioned it at the end, as opposed to 15 in the beginning. Maybe the rather abstract topic of N-S conflict was experienced through the numerous concrete examples. Concerning expectations in the domain of emotions and reflecting/understanding, no student wrote a specific statement at the end of the module. Only one person referred to ESD, and that was by way of expressing interest in being introduced to Agenda 21.

However looking at the *single final statement about the most important message they got through the module*, which students could give at the end of the 2nd questionnaire, a different picture emerges: ESD and global learning was the most important fact 7 students learned through the module, which paralleled a change in motivation. The insights of students show that some of them felt the inequity in the world (4 statements) and were encouraged that it was possible to contribute something to the solutions (4 statements).

Pre- / post-concepts

Question: What is the pre-concept and post-concept of the students concerning different terms of the field of ESD, and where do they have the information from?

(Remark: the lecturer had no emphasis on definitions of these terms.)

Origin of knowledge of the four terms: sustainable development, agenda 21, global learning and environmental education:

One tendency is clear: according to the students' answers, they obtain most of their information from the media, except for global learning.

Definitions

Agenda 21, followed by sustainable development had the lowest ranking. 60% of the students indicated not knowing "Agenda 21"; the average of points for the explanation was 0.4. And even though only 10% indicated not knowing "sustainable development", the average number of points was only 0.8. Different experiences in BNE showed that in German, the term of "Nachhaltigkeit" is often related to long-lasting and not to sustainable development. This was also partly the case with students of this module (about 10 statements). Besides "Agenda 21", "global learning" had the largest gain - which is understandable, as it was one of the goals of the module.

As environmental education was not the focal point of the module, it is not surprising that the number of points for this showed the lowest increase for the module.

After the module, “Agenda 21” reached almost the highest ranking. It seems that in a field where the students didn’t know much, it was easier for them to learn new things than it was in areas where they already had some knowledge. This could be an indication that it is easier to acquire new concepts than to change existing concepts. Maybe it is also easier to understand Agenda 21 than the educational topics.

Competencies

Questions:

Are there indications that tell us more about the competencies the students bring with them (referring to the domains of our concept)?

Which competencies helped the module to develop?

The changes in motivation showed that students gained certain competencies during the module: change of perspective, dealing with complexity, basic knowledge.

Factual knowledge: Student-teachers felt their largest need for improvement to be in the field of factual knowledge (questions of expectation as well as questions of competencies). As opposed to the results of the expectation questions, the results of the competency questions show that they gained considerable factual knowledge; the final statements indicate the same tendency.

Competencies to deal with complexity had the same rank as factual knowledge in the beginning, but the students’ answers in the 2nd questionnaire indicate a lower improvement there than in factual knowledge (second of five). Other parts of the investigation do not confirm that these competencies were improved considerably.

Competencies to act at school: Even though this competence ranked third in the list of those needing improvement in the beginning, it had the smallest gain at the end of the module.

Gaining emotional competencies was not considered a high priority in the beginning - the improvement ranked four out of five.

The need for *ethical competencies* (value clarification, developing a philosophy) was indicated to be about the same as emotional competencies, but ranked third out of five in the gain. This seems to be the result of one whole session devoted only to values during the module.

The interviews brought up a new point, which didn’t appear in the questionnaire: setting a good example as a teacher, and the authenticity and credibility of the teacher.

Lifestyle

Question:

How do the students look at their own lifestyles regarding SD? Did it change during the module?

The general tendency was that the students perceived all six areas as basically desirable, but did not quite reach the desirable level.

The investigation showed clearly that students perceived themselves as not sufficiently *politically engaged*, and the difference between where they were and the desired state, increased during the module. The same effect was observable in the field of *environmental action*, even though they ranked their competencies in this regard much higher in the beginning.

Consuming socially sound goods and services as well as social engagement had about the same status. The difference between the actual and the desired state did not change during the module. The relationship to nature was the only field in which the students perceived themselves at the desired state. At the end they ranked themselves even higher than this state.

The highest importance was accorded to “*dealing carefully with yourself and other humans*”. The difference between then and the desired state was small, and stayed low during the module.

In terms of memberships in NGOs and other institutions, parents seem to have an influence on the memberships of the students - they function as a guide.

What did we learn?

Conclusions for the institution PHZH

The PHZH should not leave it up to the media to determine what their students learn about education for sustainable development, but rather should include it as a compulsory part of the teacher-training curriculum. For this reason, it should investigate how different lecturers understand ESD, and what aspects of ESD they are currently including in their modules. Lecturers’ needs must be identified; in order to find efficient ways to close the gaps in their knowledge, it is necessary to design an advanced training that responds to the results of the evaluation. This asks for a general concept of ESD in our institution including areas like teacher training (modules, practice placements, portfolio) in-service teacher training, quality criteria for schools (including the management of the institution PHZH itself).

Conclusion for the module:

The module contributed in a valuable way to the following goals:

- Introduction to the historical roots of worldwide inequalities, and to the actual impacts of the globalized world economy and world society.
- Understanding of the concept of sustainable development (Agenda 21) and various attempts to implement this international guiding principle for the 21st century.
- Possibilities and limits of ESD, what is asked of it according to the guidelines of Agenda 21.

How could teaching the module in the future be improved?

Dealing with the danger of moralizing and proselytizing is an aspect to watch carefully. As I understand it, moralizing has a lot to do with imposing one's own values, attitudes and even feelings on others. The most important goal, therefore, should be that the students themselves realize what their own values, attitudes and feelings are, and the various dilemmas they cause. One way, to cope with this, are dilemma discussions and role games. Another, even more effective way, could be to take real life situations, e.g. the school as a living space, where students have to take real decisions and responsibilities.

Students didn't mention a gain of competences through the module in acting at school, but the interviewed students saw it as an important competence. Some topics provide many possibilities for real actions at school: school buffet, camp organization, handicrafts at school, dealing with diversity (e.g. cultures, sex, species), ... An activity at the teacher training institution with the students could help to acquire appropriate competences. Certainly *the role of the teacher* in setting a good example, in his/her authenticity and credibility has to be discussed in the module.

The ability to name clear *definitions of key terms* could help students to understand more precisely the concept of ESD. A short conceptual paper with a glossary could provide a helpful basis (suggestion of the lecturer).

What would help the students most to *deal with complexity*? Drawing impact-diagrams could help them to better understand complexity, as could thinking along a timeline, as this requires the students to change perspectives as they progress. An efficient way to introduce systems theory should be developed for this reason.

Learning how to deal with helplessness and depressed moods in class was originally an expectation of four students. Nobody mentioned it at the end, however it was a topic in the interviews with the students. Dealing with these feelings is one of the challenges of ESD especially as young people often have strong emotions in relation to these issues. Accepting, sharing and not repressing emotions, is one step to cope with them. Appropriate methods have to be developed.

As six students proposed to *stay longer with a particular topic* and to deal with it in more depth, it would be appropriate to select just a few examples that lend themselves to addressing numerous aspects of ESD.

The lecturer insisted, that the most efficient training would be a compulsory practice placement in ESD.

Teaching strategies, learning sites, materials

Main Teaching strategies:

The whole module was a mix of a variety of teaching methods, and included a lot of information on facts, teaching methods, teaching materials and sources for information/ experiences. On the whole, the module was densely packed, which, according to the lecturer, was obviously appreciated by the students. Her basic strategy was:

- To activate previous knowledge of the learners, to make them aware of their pre-conceptions, and to make considerations about the topic in advance
- The module's basic structure was:
 - Past and Present
 - What future?
 - What can teachers contribute to sustainable development?

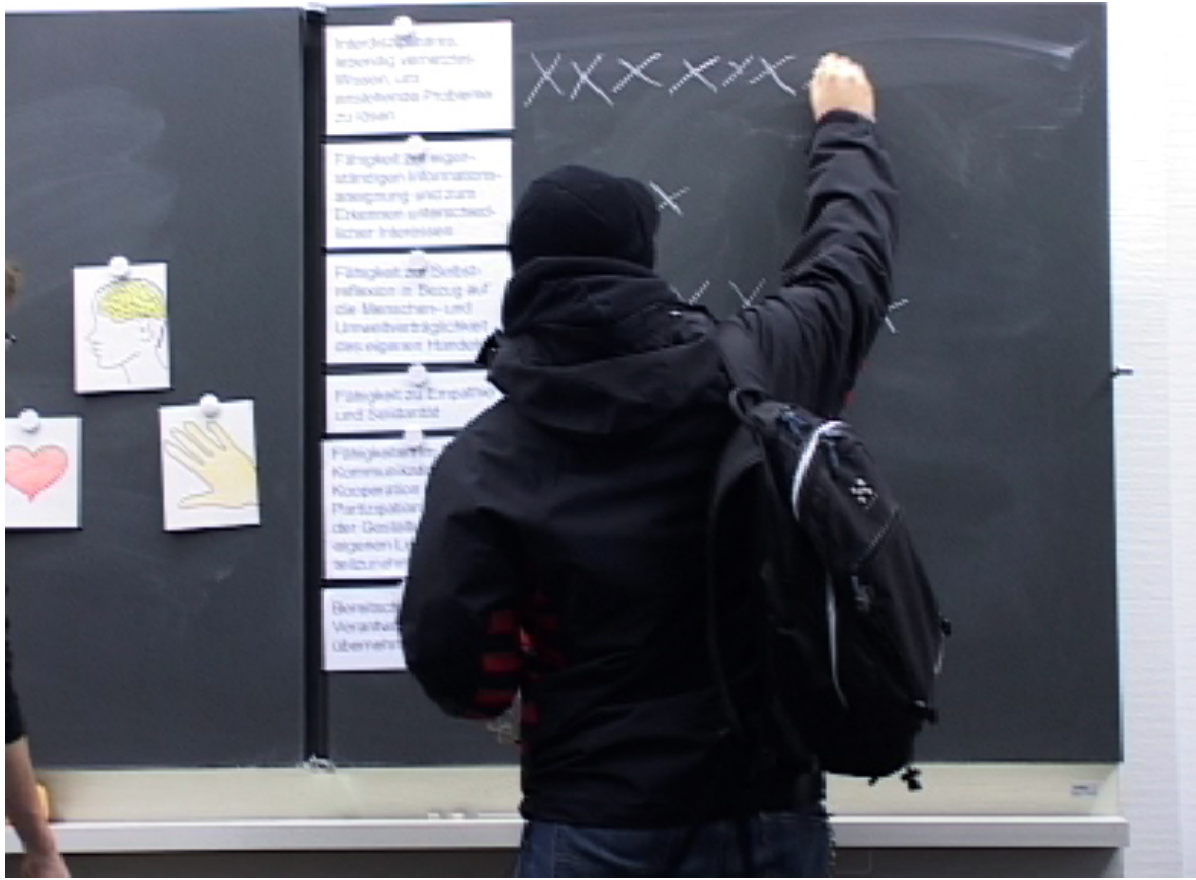
A choice of presented teaching materials:

- Arbeitsgemeinschaft der Hilfswerke (Eds.) (1999): Kinderarbeit Fotos. 10 Bilder A3 mit kurzem Text zu jedem Bild. Bestell-Nr. 1.1.8046 (www.globaleducation.ch), currently out of print.
- Bildungsstelle der Arbeitsgemeinschaft der Hilfswerke in collaboration with Stiftung Bildung und Entwicklung (2003): Kleiderkoffer: die Welt am eigenen Leib. Box on clothing mit 7 books, 2 folders, 2 videos, 1 folder with 24 transparent copies, 1 folder with 9 informationpanels (used in DVD of the case study), 1 Box with 6 fumble riddles, 1 Box mit 6 articles of clothing. Lending: Informationszentrum, Pädagogische Hochschule Zürich PHZH, Fr. 30.--. (<http://biblio.unizh.ch>)
- DEZA, Bildung und Entwicklung, Arbeitsgemeinschaft der Hilfswerke (Hrsg.) (2005): Sport - globales Spiel, Poster. 16 Poster A2, farbig, mit Begleitdossier für Lehrpersonen. Bestell-Nr. 2.3.8025 (www.globaleducation.ch)
- Diamond, Jared (2000): Arm und Reich. Fischer Taschenbuchverlag, Frankfurt am Main (German version)
Diamond, Jared (1997): Guns, Germs and Steel. The Fate of Human Societies: W. W. Norton & Company, New York (original English Edition).

- Filme für eine Welt CH, Baobab A, EZEF (2005): Die Welt ist rund. Fussballträume - Fussballrealitäten DVD-Video/DVD-ROM, 5 Filme und Begleitmaterial, 120 Minuten. Bestell-Nr. 2.3.8027 (DVD mit verschiedenen Filmen samt didaktischem Begleitmaterial).
- Geisz, Martin (2000): Lernzirkel Lateinamerika. Buch Verlag Kempfen. 47 Seiten.
- Geisz, Martin (2001): Lernzirkel Indien, BVK. 48 Seiten.
- Geisz, Martin (2005): Lernzirkel Afrika. Buch Verlag Kempfen. 80 Seiten.
- Gugerli-Dolder, Barbara (Hrsg.) (2004): Im Schla(u)raffenland, Unterrichtshilfe zum Thema Pausenkiosk und Ernährung. Zürich, Pestalozzianum Verlag (Teaching Unit on break buffet and food).
- Gugerli-Dolder, Barbara und Martin Stünzi (2000): Schule erleben - Schule bewegen. Schüler/innenheft und Lehrerkommentar. Zürich, Lehrmittelverlag des Kantons Zürich (Teaching materials for the school as a learnscape for grade 3. to 6. , adaptable for higher grades).
- Gut leben statt viel haben, Öko- und Eine-Welt-Bilanzen für die Schule, 2004.
- Trilogie „Perspektive 21“ des blmv: „Arbeitswelten“, „Konsum“ und „Rohstoffe - Energie“ (je Themenheft, Hinweise für Lehrerinnen und Lehrer sowie Klassenmaterial). Lehrmittelverlag des Kantons Bern (www.nmm.ch)
- Wenker, Marie-Claude (2001): So leben sie. Familien aus 16 Ländern zeigen, wie sie wohnen BLMV, Arbeitsgemeinschaft der Hilfswerke, 16 Fotos A3, mit Begleitheft. Bestell-Nr. 1.8.8003 (www.globaleducation.ch)

The Foundation for Education and Development is the Swiss national centre for Global Education

They support teachers at all levels in their daily work by providing stimuli for their lessons, which are directed towards a viable development in a global society. They sell and lend over 800 tried and tested teaching aids in German, French and Italian and provide teacher training. They inform and advise on Global Education and are part of a network of national and international organisations with similar aims. www.globaleducation.ch.



North – South Relationship: Past – Present – What Future?

Case Study FHNW PH Solothurn

Esther Bäumler

Initial Situation

Education for sustainable development in Switzerland

The official strategy for implementing Education for sustainable development (ESD) in Switzerland is coordinated by the national platform EDK-Association. Represented in this association are the EDK (Swiss Alliance of Educational Directors), as well as six Federal Agencies from the areas of Education, Health, Environment and Development.

The Platform EDK-Association's procedural paper (EDK, 2005) provides an overview of the national and international documents, and outlines the visions and strategies on how to implement ESD. The paper emphasises integration into already existing structures of the educational system. In addition, an action plan was presented in March 2007 that prioritises compulsory education and teacher training. Concrete steps will be taken in the near future. The documents our found on the internet www.edk.ch.

An important general condition to consider in Switzerland is the fact that the Swiss educational system is coordinated and controlled at the level of cantons. This means that each of the 26 cantons has its own school system and consequently its own curricula. The EDK can offer recommendations, but the final decisions are made by the cantons. Only the secondary school II (after 10th year of school) s regulated at the federal level.

Up until now a common concept and understanding in relation to ESD have been missing, as well there has been a lack of a transfer programmes for schools. Nevertheless, a number of education universities (Pädagogische Hochschulen) are engaged in integrating ESD into the curricula for teacher training. An overview of this is offered by the Internet data bank of the Environmental Education Foundation Switzerland (Stiftung Umweltbildung Schweiz) at: www.umweltbildung.ch/Ilb.

The Environmental Education Foundation Switzerland (Stiftung Umweltbildung Schweiz (SUB) - www.umweltbildung.ch) and the Foundation for Education and Development (Stiftung Bildung und Entwicklung (SBE) - www.globaleducation.ch) provide coordination and support of the efforts to integrate ESD into the schools and teacher training. A further initiative stems from the school publishing company, which integrates the concerns and content of ESD in a teaching aids series related to life and cultural studies (www.nmm.ch).

The implementation of ESD at the school level is still, however, very much in the beginning stages. Initiatives are underway in schools in the areas of environmental education, global learning, civic education, health education etc. These subjects are, however, often the focus of specific project weeks and only partially integrated into daily lessons. So far ESD is neither anchored in the weekly school routine nor has it been accepted as a term.

ESD in canton Solothurn

The canton Solothurn has opened an office to promote sustainable development in the canton. Development goals were defined and achievements guaranteed for the period 2006 to 2008 in a governmental executive resolution. This resolution also contained goals for ESD. Likewise it included the decision that training opportunities for teachers in teacher training and further education shall be offered (www.agenda21-so.ch).

ESD in the advanced technical college of north-west Switzerland, Solothurn (=Pädagogische Hochschule der Fachhochschule Nordwestschweiz – PH FHNW)

In 2004 the former educational university Solothurn, now part of the educational university of the advanced technical college of north-west Switzerland, committed to make Education for Sustainable Development a priority. Already in the autumn of 2004 the educational university organised a well-attended national workshop-conference (SIEBER, 2004).

During the past few years a lot of work has gone into establishing this focus in research and development, as well as anchoring it in training and further education. In the training curriculum, ESD is at present compulsory for all students as part of the social- and life and cultural studies. In addition, various research initiatives are underway or are being planned.

The Institute for Further Education and Consultation (Institut für Weiterbildung und Beratung - IWB) is involved in the Comenius Project at hand; thus the remainder of this paper focuses on further education.

ESD in further education for teachers at the PH FHNW Solothurn

Various lecture series and courses were offered to teachers in the years 2004-2006 in Solothurn. There was, however, not a great demand for such offerings. This was not just the case in Solothurn; other cantons also had to cancel similar opportunities for continuing education.

Why is it that in further education for teachers, ESD opportunities are not in demand? Possible reasons for this could be:

- Further education for teachers is generally voluntary or optional. The offerings therefore need to be perceived by teachers as relevant and attractive.
- Teachers are practically oriented. In other words, the offerings need to be seen as easily translatable to the classroom and school life, and they also need to provide an increase in value. ESD concepts, however, are still hard to grasp, and there exists a gap between theoretical concepts and their application in the classroom and lesson plans. Teachers generally experience a lot of resistance toward theoretical approaches.
- The general conditions in schools hinder the implementation of ESD, for example, the 45-minute lessons, the class sizes, the classrooms, and thus the interest of the teachers is minimal.
- Teachers are already being stretched beyond their capacity with other reforms and pressing questions - questions of discipline and violence, the establishment of headed schools, the conversion of block times, and the integration of foreign-language children and children with special needs.

In summarizing the initial situation one can thus say that there exists a contradiction between:

- The IWB's own objectives and the assignment from government to offer ESD in further education for teachers.
- Teachers' demand and need for offerings in the area of ESD.

What were the aims of the initiative?

Due to the contradictory situation at the outset (see chapter 1), the IWB decided to develop a plan in order to bring clarity as to whether and how the issue of ESD can be launched in further education. Three analysis aspects are planned as the basis of this concept:

- Supply and demand.
- Market.
- Success factors.

The analysis is still being developed. Part of it has been realised in the context of a conference that focused especially on an analysis of success factors. The conference took place November 15, 2006, in Solothurn. In the following, the conference will be the sole focus of discussion. Thus, with this case study, the aim was not to research or implement a particular skill from our competence model. Rather it was to attempt to find a basis upon which to successfully launch further education offerings and opportunities in the realm of ESD.

Content-related aims of this conference were:

- To identify success factors for further education offerings on ESD.
- To identify the interface points between ESD and ongoing school projects. To describe the possible increase in value and efficacy that might result from building on these interface points. To recognize the need for further education.
- To identify and name those ESD focal points that are attractive to teachers.

At the organisational level the conference pursued the following aims:

- To anchor of the subject matter in the IWB and recognize any synergies present in the IWB.
- To initiate possible collaboration opportunities with external partners and to prepare first steps.

What did we do?

Planning

Based on the aims, we focused on two main areas regarding the content (for the programme, see conference pamphlet in the appendix):

- Points of interface and synergy between ESD and current educational developments. Examples from Europe. Conclusions and next steps for further education in Switzerland.
- Current research projects on ESD in the areas of teaching and school development in Switzerland. Conclusions and next steps for further education.

The conference was designed as a workshop with the following elements:

- Lectures with theses, that focus on further education.
- Moderated rounds of talks: discussion of the theses, transfer for further education in Switzerland.
- Action plan with chosen participants from various rounds of talks: record success factors and first implementation steps. Moderation by the head of the institute.
- Conference reporter: Recording of discussion items that are very current and charged.

Targeted as an audience were:

- Qualified experts from teacher training: further education, education, research and development.
- Representatives from inner canton educational departments and from the EDK.

- Authors of teaching aids.
- Other interested persons.

Publicity

Publicity for the conference was done with a huge mailing. Participants from the 2004 conference were written to, as well as individuals from the directory of the Environmental Education Foundation Switzerland (Stiftung Umweltbildung Schweiz). In addition, announcements about the conference were put in a variety of magazines, on the web page and in internal PH posts.

Realization

About 60 participants registered for the conference, which was more than we initially expected. The participants were made up of:

- Lecturers from educational universities who specialize in the areas of environmental education, the human being and the environment, and other subject matters.
- Designers of further education from educational universities.
- Self-employed individuals working in the areas of environmental education, publishing houses of teaching aids and private educational businesses.

The participation of a number of people from the IWB who work in other areas was enjoyable.

Documentation

During or shortly after the conference the following visual, audio and written documents were put together:

- Power Point Presentation of the lectures.
- Flip-charts of the two rounds of talks.
- DVD und summary of the concluding discussion round.
- Report by the conference reporter.
- Photos taken by various participants during the conference.

The written documents were then put on the IWB website.

(www.fhnw.ch/ph/iwb/download/bne/)

Research questions

We captured the aims of the conference (see chapter 2) in the following list of criteria and indicators:

- Identification of interface points between ESD und current educational projects. Description of the possible increase in value that might result from building on the holistic approach of ESD. Recognition of the need for further education.
Indicator: Three interface points are explicitly named, and a convincing increase in value is described for each one.
- ESD focal points that are attractive to teachers are identified and named.
Indicator: Three focal points are named that are attractive to teachers.
- Identification of success factors of ESD-related further education. Reflections on suitable formats for further education in the area of ESD.
Indicator 1: Three existing products are named in which ESD can be included.
Indicator 2: Two new products are named that are suitable for ESD.

At the organisational level the conference also pursued the following goals:

- To anchor of the subject matter in the IWB and recognize any synergies present in the IWB.
Indicator 1: The subject of ESD is perceived by three additional people in the IWB and further pursued in their work.
- To initiate possible collaboration opportunities with external partners and to prepare first steps.
Indicator: A concrete common initiative ensues with a partner institution.

Research methods

Analysis of documents

The lectures are analysed in regards to the above-mentioned criteria and indicators.

Preparation and evaluation of the discussion rounds

IWB employees were engaged as moderators for the discussion rounds. They were introduced to the task together and received written instructions that included aims. After the conference, the written documents from the discussion rounds were summarized, and the relevant points were elaborated upon.

Evaluation of the conference participants

An evaluation form was sent to all the conference participants about 6 weeks after the conference, once the documents had all been loaded onto the web site. Eight of the 58 evaluation forms that were sent out were filled out and sent back.

Interviews with IWB employees

Two months after the conference, we interviewed four IWB employees who had participated in the conference, but were not specifically engaged in working with the subject matter of ESD. The following persons were interviewed according to a conversation guide:

- Head of study courses and school directorship in Solothurn.
- Head of CAS, trainer in professional studies, Solothurn.
- Co-head of department of extra occupational further education, Aargau.
- Management of practice groups in job introduction, Solothurn.

All the interviews were carried out and evaluated by the same employees.

Description of the empirical data

Analysis of the documents from the lectures

Two excerpts from the lectures of R. Steiner and U. Nagel that were seen as very pertinent to the aims of the conference were recorded.

Regina Steiner:

- ESD means a reorientation - taking the time and offering: longer courses, accompanied teaching.
- The whole human being as the subject of the learning process - atmosphere and the aspect of well being.
- Participation in further education.
- Professionalisation, action research, school development.
- Networking, educational landscape.
- Thematising structures and general conditions.

Ueli Nagel:

- In order to integrate ESD in schools, the impeding structures in day-to-day school life must also be recognized and reflected upon.

- Knowledge from further education becomes practically effective when the discussion takes place in relation to actual situations. Further education in relation to ESD should also be offered within schools so that the local setting of the respective school can be thematized as a learning occasion and opportunity.

Discussion rounds part 1: Interface points and increase in value

A comparison between the various discussion rounds shows three frequently named interface points in relation to current educational themes, as well as a number of key words related to a possible increase in value on this topic:

a) School development, school profile

- School profiles, quality development of schools.
- Cooperation with partners outside of the schools, networks made of schools, business and community → also make use of these for preparing a career choice and related training.
- Participatory team processes, new team culture.
- New creative space for schools.
- Schools as hosts for further education.

b) Lesson development, day structures

- Participation und co-creation.
- New teacher roles, personal development perspectives, decline in burnout.
- Variety of methods, new ways of teaching and learning.

c) Teaching and learning across subjects.

- Current knowledge on social questions, connection with real life.
- An easing of workload happens through networking.

Discussion rounds part 2: Strategic reflections and products

Amongst others, the following were mentioned as strategic reflections:

- Networks, extending and further developing cooperation and lobbying efforts.
- Making use of communication and publicity.
- Looking for and building upon points of contact, connecting to the needs of teachers as a starting point.
- Development of teaching aids and supporting their implementation.
- Clarifying the understanding of what education is all about.

In reflecting on suitable ways to pursue further education in the realm of ESD, the following point to an emerging direction:

- Coaching und learning accompaniment.
- Further education with the inclusion of students.
- Allowing practical experiences of those working in the field to be delivered.

Action plan and conference observer

The action plan prioritised once more:

- The usage of possible interface points with other educational matters.
- Making available concrete offerings that are not overloaded with theory.
- The meaning of networks, alliances and publicity.
- The focus on and inclusion of students.

The conference observer Johannes Tschapka called his summary „Teachers need good news“ and emphasised the significance of networking and general political conditions.

Participant evaluation (questionnaire)

The feedback shows that the conference succeeded (for details, see appendix) in:

- Clarifying the concept of ESD.
- Demonstrating interface points with other educational projects and the increase in value derived from such overlap.
- Providing stimulation, ideas and inspiration for new strategies or plans for ESD in further education.
- Contact possibilities in order to establish future cooperation.

Interviews with IWB employees

The interviews were recorded in writing, but not transcribed. In the following a few interesting aspects relating to certain particular questions are cited.

What do you think is worth pursuing based on the lectures and results from the discussion rounds?

- Incorporate ESD in school-internal further education by bringing coaching into schools.
- Sensitise the school management to the topic of ESD, integrate ESD in offerings for school directorships.
- Strengthen and encourage practical approaches, make the success achieved by projects visible. „The ESD concept and plan needs to include practice.“

Where do you perceive interface points between ESD and educational projects/existing offerings in your area of work? What should an offering look like?

- The term ESD is too out-of-touch, the underlying principles need to be clarified. Offerings need to be relevant to teachers and schools. ESD needs to have a qualitative effect.
- A comprehensive understanding of ESD means that all existing offerings are affected. In this sense, ESD could be understood more as a label than as content. In other words, criteria would need to be developed to measure any product by.
- The term “school profile” needs to be clarified at the political level. If there are schools that have sustainability as part of their profile, then further specialisations and a corresponding further education are also necessary.

Which next steps are, from your point of view, important for bringing ESD into further education? Both in your area of work and in general?

- Clarify what is already being done in schools in relation to ESD and how one can approach schools. What do teachers understand under the term ESD?
- Link and network resources so that schools can hear about each other’s projects, share their experiences and learn from one another. Discussion platforms with teachers.
- Collaboration with other institutions and people, also with those who at first sight don’t have anything to do with us, for example, artists.

Analysis of the empirical Data

Checking the results according to the aims and indicators of the research questions (see chapter 4)

a) Identification of interface points between ESD and current school projects. Description of a possible increase in value derived from these. Recognition of the need for further education.

Indicator: Three interface points are explicitly named and a convincing increase in value is described for each one.

Three obvious interface points were identified; the increase in value, however, was more hinted at rather than described in a concrete manner:

- School development, school profile → quality development of schools / useful collaboration for preparing a career choice / new team culture.
- Lesson development, block times / day structures → new teacher roles open up development perspectives, can also signify a relief in work load, less burn out / new teaching and learning methods for ESD and for block times.

- Teaching and learning across subjects → work loads can be eased through networking.

b) Naming of focal points in the ESD concept and plan that are appealing for teachers
Indicator: Three focal points are named that are appealing for teachers.

No appealing focal points were named. Although there was frequent emphasis on how important this was, none were actually named.

c) Identification of success factors of ESD-further education offerings. Reflections on suitable formats for further education in the realm of ESD.
Indicator 1: Three existing products are named, in which ESD can be included.
Indicator 2: Two new products are named that are suitable for ESD.

Integration into already existing products:

- ESD offerings in the context of school-internal further education, making use of the local setting of each school as a learning situation and opportunity. Making use of the situational relevance of ESD.
- Integrate ESD in school directorship training.
- To review all IWB offerings according to ESD criteria and to distinguish them with an ESD label.
- To integrate action research on one's own practice in existing offerings.

Possible new products:

- Coaching or learning accompaniment: Enables a joint learning process in order to accompany the reorientation through ESD in a practically effective way.
- Event following the model of the Austrian summer academy. Cooperation between various institutions in Switzerland for the organisation of such an event. Ensuring that, next to professional discourse, there is also time for the participants to deepen what they are learning and experiencing, to share with one another, and to relax.

d) Anchoring the subject of ESD in the IWB and recognizing synergies within IWB
Indicator 1: The subject of ESD is perceived by three additional people in the IWB and pursued in their own work areas.

This question cannot be answered conclusively. A number of people from the IWB participated in the conference. The interview conversations show a willingness to reflect together on ESD and to follow up on the subject.

e) Initiate possible cooperation with external partners and prepare first steps.
Indicator: a concrete common initiative with a partner institution results.

This question can also not be answered conclusively. The conference provided us with the opportunity to cultivate contacts and draft initial ideas.

Which new questions emerged?

- The significance of general conditions, context and structures were mentioned numerous times. In other words, it is important to take these into consideration when launching new offerings or to work towards a change.
- The significance of networks and alliances was greatly emphasised, and this at all levels: those offering training, teachers, schools, and students.

What have we learnt for the future?

Looking back – in relation to the conference, and to the planning and organising of the conference

- Less is more: Less lectures and more space for moderated discussions and exchange amongst participants. Interesting ideas and contacts emerged during the discussion rounds.
- Wherever possible, to implement the ESD principles at the conference itself. Putting methods into action that are oriented toward vision, checking possibilities of participation etc.
- To define the aims even clearer at the beginning and to design the programme accordingly, and consistently so. During the planning phase certain parts of the programme kept getting changed etc.
- Greater clarity on the organisational end of things as well as in dealing with resources.

Forward look – in relation to the planning of ESD offerings for further education

The conference evaluation shows us ways forward in the following areas:

- Continuing work on subject interface points (including general conditions).
- Development of products.
- Development of offerings across networks.

Continuing work on the interface point of school development

The following increase in value could be achieved thanks to ESD:

- Contribution to the development of quality (possibly in relation to action research).
- Making use of collaboration with partners outside of the schools for job preparation.
- Contribution to a new team culture.

The following are possible starting points:

- Clarification about integration of ESD in school development.
- Clarification of an explicit ESD school profile and corresponding political conditions.
- Checking of the possibilities of integrating ESD in the CAS school directorship.

Continued work on the interface point of development in relation to teaching

The following increase in value could be achieved thanks to ESD:

- ESD offers interesting subjects and methods, new ways of teaching and learning, and addresses the potential of longer time units.
- ESD potentially opens up new development perspectives for teachers, for example, job mobility thanks to outside contacts with businesses and communities.

The following are possible starting points:

- Identification of ways of learning that are interesting for ESD and for block times (key words: project learning, learning across various subjects, participation, work related to the future, visions und scenarios) and the development of a set of methods.
- Development of possibilities to include the real-life connection that ESD holds and the learning opportunities with partners outside of the school system.
- Discussion of the general conditions necessary to implement block times in the canton.

Development of products

The following are possible starting points:

- Development of ESD offerings in the realm of further education within schools.
- Reviewing any offerings that already exist concerning integrating ESD.
- Examining how teachers working in the field can be brought into play as multipliers.
- Reviewing the idea of a ESD label for IWB further education offerings.

Offerings across networks

The following are possible starting points:

- Checking the possibility of a collaborative offering with partners, such as a summer academy following the idea of the Austrians.

Reviewing the implementation of the results in hand from the Comenius work, together with the educational university of Zürich (PH Zürich).

Teaching strategies

Materials

EDK (2005) UNO-Dekade Bildung für eine Nachhaltige Entwicklung 2005-2014. Vorgehenspapier der Plattform EDK-Bund.

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Education for Sustainable Development and Global Citizenship in Wales

David Norcliffe, University of Wales

This study focuses on two projects which were intended to assist the process of embedding Education for Sustainable Development and Global Citizenship (ESDGC) into Initial Teacher Education and Training (ITET). These projects came about as a result of a decision by the Welsh Assembly Government to promote ESDGC across the whole range of education from Early Years to Life Long Learning. This was part of the process of creating a distinct Welsh identity in education as a result of powers which had been held centrally by the UK government being devolved to Wales (see appendix 1).

The first project was concerned with gathering and constructing material which could be used in ITET and disseminating this material via a web site. The second project was concerned with providing training in the ITET institutions in Wales for teacher educators on how to integrate ESDGC into their teaching.

As a result of a decision taken by the Welsh Assembly all educational institutions in Wales have a binding statutory duty to promote and pursue sustainable development and global citizenship in both their curriculum and their activities - transport, heating, purchasing etc. Supporting this commitment are the Welsh Curriculum and Schools Inspectorate Authorities (ACCAC & Estyn respectively). This presents an invaluable opportunity in the long term to mainstream ESD&GC into educational policy.

This situation is unlikely to be reversed with a change of Government as has happened in other countries. This is due to a number of factors. First, there is a specific Welsh attitude to the environment which is expressed through art, literature and music which places a high value on its enjoyment and preservation. Secondly, Wales has always compared itself to England, and this comparison is not helpful - England is richer, more influential in the world etc. Now, however, there is clear move to view Wales as part of the wider world, to see itself as a nation amongst nations, and her people as global citizens. The result of these attitudes is that of the four parties in Wales, the three strongest, the Labour Party, the Liberal Democrats and Plaid Cymru (the Party of Wales) are all fully supportive of the ESDGC agenda.

The Welsh Assembly Government has put forward an Action Plan to:

- *Make sustainable development and global citizenship a feature of required whole school policy for all schools.*

- *Undertake to include sustainable development and global citizenship in the review of future requirements for educational strategic plans (ESPs) and School Improvement Plans.*
- *Review the place of sustainable development and global citizenship in the curriculum as part of ACCAC's current curriculum review.*
- *Introduce sustainable development and global citizenship into initial and induction training opportunities for teachers and develop specific Continual Professional Development training.*

Definitions

To clarify and reinforce the relationship between ESD & EGC, the following definitions are usually referred to:

Education for Sustainable Development

Enables people to develop knowledge, values and skills to participate in decisions about the way we do things individually and collectively, both locally and globally, that will improve the quality of life now without damaging the planet for the future

(UK Panel for Education for Sustainable Development)

Education for Global Citizenship

Enables people to understand the global forces which shape their lives and to acquire the knowledge, skills and values that will equip them to participate in decision making, both locally and globally, which promotes a more equitable and sustainable world.

Education for Sustainable Development and Global Citizenship is about

- The links between society, economy and environment and between our own lives and those of people throughout the world.
- The needs and rights of both present and future generations.
- The relationships between power, resources and human rights.
- The local and global implications of everything we do and the actions that individuals and organisations can take in response to local and global issues.

Source: Education for Sustainable Development and Global Citizenship Guidance, Curriculum and Qualifications Published by ACCAC (on behalf of the Welsh Assembly Government Panel for Sustainable Development and the Welsh Assembly Government Working Group on Global Citizenship) published 2002 p 6.

An all-Wales Approach to Embedding Education for Sustainable Development and Global Citizenship into Initial Teacher Education and Training: 04/05 project.

As mentioned above, the Welsh Assembly Government had proposed that ESDGC be integrated into Initial Teacher Education and Training in Wales, and this project was established in order to fulfil that aim.

Aims

- 1) To identify the knowledge needed by ITET teachers and students in order for them to effectively address the 9 key concepts within ESDGC.
- 2) To develop the associated pedagogy to enable effective delivery of ESDGC.
- 3) To assess the resource implication of these aims and to make recommendations regarding existing materials and development of bespoke materials.

The 9 key concepts were:

- **Interdependence:** understanding how people, the environment and the economy are inextricably linked at all levels from local to global.
- **Citizenship and stewardship:** recognising the importance of taking individual responsibility and action to make the world a better place.
- **Needs and rights:** understanding our own basic needs and about human rights and the implications for the needs of future generations of actions taken today.
- **Diversity:** understanding, respecting and valuing both human diversity - cultural, social and economic - and biodiversity.
- **Sustainable change:** understanding that resources are finite and that this has implications for people's lifestyles and for commerce and industry.
- **Quality of life:** acknowledging that global equity and justice are essential elements of sustainability and that basic needs must be met universally.
- **Uncertainty and precaution:** acknowledging that there are a range of possible approaches to sustainability and global citizenship and that situations are constantly changing, indicating a need for flexibility and lifelong learning.
- **Values and perceptions:** developing a critical evaluation of images of and information about the less and more economically developed parts of the world and an appreciation of the effect these have on people's attitudes and values.
- **Conflict resolution:** understanding how conflicts are a barrier to development and a risk to us all and why there is a need for their resolution and the promotion of harmony.

“Education for Sustainable Development and Global Citizenship” published by ACCAC for the Welsh Assembly Government (2002)

These concepts represent the ideal that the Welsh Assembly is aiming for. The reality is unlikely to match this in all its aspects, but should, nevertheless, promote the following skills, values and attitudes:

Skills

- Critical thinking.
- Ability to argue effectively.
- Ability to challenge injustice and inequalities.
- Respect for people and things.
- Co-operation and conflict.
- Resolution.

Values and attitudes

- Sense of identity and self esteem.
- Empathy.
- Commitment to social justice and equity.
- Value and respect for diversity.
- Concern for the environment and commitment to sustainable development.
- Belief that people can make a difference.

The project, which comprised representatives from ITET institutions in Wales alongside representatives from NGOs which had already made substantial contributions to the ESDGC agenda such as Oxfam, Amnesty International and the Royal Society for the Protection of Birds, made an audit of standards and policies for EGCSO from Estyn, ACCAC and the Welsh Assembly and of similar projects from elsewhere in order to ascertain the status quo. A range of materials both from within the group and sourced from other organisations and projects were incorporated into the project, including examples of student work in partner schools. A skills menu (see above) was developed to promote values and attitudes in relation to EGCSO, and both a 'knowledge path' - what teachers need to know in order to comprehend the 9 concepts and a 'pedagogy path' - how to teach these concepts, were developed.

Using a diamond ranking system, a list of priorities for ESDGC was developed.

- 1) Training to embed ESDGC across the whole ITET curriculum.
- 2) Training on why ESDGC is an important issue.
- 3) Training on background issues to understand the concepts associated with ESDGC.

- 4) Training in preparing students and school mentors to incorporate ESDGC on Block School Experience.
- 5) Training on the pedagogical tools associated with ESDGC.
- 6) Training on resources for use with students in schools on ESDGC.
- 7) Training on out-of-classroom learning in ESDGC.
- 8) Training on the statutory framework in ITET that supports ESDGC.

A collation of existing materials and materials was created by, or commissioned by, the task and finish group. This involved contacting ITET College in Wales and consulting with colleagues on the external changes needed to promote institutional change, best practice world wide, and the inclusion of all ITET Colleges in the project: In particular ensuring that Colleges, schools and trainees all had access to quality, Wales-relevant, materials for ESDGC, in one place.

It was decided that the best way to make the materials which had been gathered and produced available was to construct a web site.

www.esdgc-wales.org.uk/.

This has proved to be a popular and well used site.

Meeting the aims

The diamond ranking system identified the knowledge needed by ITET teachers and students in order for them to effectively address the 9 key concepts within ESDGC. The material on the web site both demonstrated that we had assessed the resource implications and, via the use of existing materials and the development of bespoke materials, provided the associated pedagogy to enable effective delivery of ESDGC.

What has been created by this project is a resource for ESDGC into which all ITET Colleges have had some input, and in a number of cases substantial input. All ITET institutions are aware of this resource and the statutory requirements which drive the process. It is expected that all institutions will make substantial use of this resource in their future planning for ESDGC and, indeed, there was a follow-up project which facilitated training for ITET colleagues based on the materials on the site. The combination of these two projects should make a substantial contribution to embedding ESDGC into ITET institutions in Wales.

Continuous professional development provision in sustainable development and global citizenship for lecturers in ITET in Wales: 05/06.

Aims

The aim of the second project was to provide a professional training programme for ITET staff at different levels:

An introduction for those staff who had no or little previous experience in the delivery of ESGC to resources and methodology which would enable them to begin the process of implementing this agenda in their own teaching.

Further training in the area for those staff who had already begun the process of implementing ESGC into their teaching.

Although the resources on the web site developed by the first project were now available to support teaching and learning in ITET at all 7 institutions in Wales which provided such training, it was apparent that their use and effectiveness would be enhanced by a programme of Continuous Professional Development (CPD).

Quantifiable Outputs against which progress was monitored

- 1) Establishing a programme of activities meeting the needs of CPD training requirements at each institution.
- 2) Publishing timetable of CPD training days at each institution.
- 3) Evaluation reports from each participating institution.
- 4) Evaluation reports from those providing the training.

Method of Approach

An effective group had already been established for the previous project 'Embedding ESGC into ITET in Wales' and members of that group indicated that they would be willing to contribute to the management of the new project to aid continuity. New members were also encouraged to participate. This group was responsible for clarifying issues, inputting expertise, ensuring applicability and maintaining relevance of this project to ITET courses in Wales. It also assisted the project leader in assessing and recommending appropriate methods and approaches for CPD training days and identifying suitable, experienced facilitators.

All ITET institutions in Wales were contacted in order to organise and publish a timetable for delivery of CPD training days, and negotiate programmes of training to meet the specific needs of the individual institutions. As a result of these consultations, a major problem arose. The group had intended to utilise the expertise of providers such as Oxfam, Amnesty International, Forest Schools, the Centre for Alternative Technology, etc. to provide the training in the ITET institutions. These organisations had already provided training in both schools and some ITET institutions which had been welcomed and appreciated, and they were both well equipped and enthusiastic about delivering the training required.

When this was discussed with key people in the institutions who were keen to implement the ESDGC agenda, the response from some was negative. Whilst they themselves had no problems with training being provided by these organisations, they felt that their colleagues, particularly those who were not yet 'on-board' with the project, would be more likely to see it as having credibility if the sessions were delivered by other academics. They expressed the view that if we wished to get the best response to the training, then we should bring in respected academics with high profiles in their subject areas, whose status would guarantee a positive reception.

Given the expertise of the providers mentioned, this was not something that we had anticipated. Having had these responses from the institutions, however, we felt that we had no choice but to re-think the training, and, for some but not all of the institutions, bring in academics who were experts in this field with track records in publishing at a high level. This caused inevitable delays in the process as such people are very busy.

The training programme was eventually set up (see appendix 2), with varied programmes depending on the identified needs of the institutions. Initial introductions to the principles of ESDGC and their implementation were given to a number of institutions who were in the early stages of implementing the ESDGC agenda - University of Wales, Aberystwyth; University of Wales, Newport; University of Wales, Swansea; University of Wales Institute, Cardiff and Trinity College, Carmarthen. These introductions were followed up in all the institutions (apart from the University of Wales, Aberystwyth) by further specific training.

Some institutions e.g. the University of Wales, Swansea had requested training in specific subject areas for their Secondary staff (teaching pupils 11-18 years), so academic experts were provided in curriculum areas such as Maths, Science, Economics and Modern Foreign Languages. Others such as the University of Wales, Newport, which has more of a Primary (3 - 11 years) focus requested training in cross-curricular areas such as children's rights, global footprint, Forest Schools etc.

Two institutions - University of Wales, Bangor, and the North East Wales Institute - had already had considerable input in ESDGC training and they requested more advanced training. Bangor is the home of the World Education Centre which, for a number of years has pursued this agenda and provided the School of Education there with a sound base. The

training provided was therefore focused on particular curriculum areas and specific age ranges.

The North East Wales Institute has had input on the sustainable development agenda and requested that their training should focus more on the citizenship aspects of ESDGC, which was provided by the Citizenship Unit of Glasgow University.

Training was also provided through the medium of Welsh for those institutions who teach through this medium.

Results

The participants in the 'Introduction to ESDGC' sessions were asked 3 questions:

- 1) Has the session made you rethink how the planet works/understand it more simply/more confident to explain it to students?
- 2) Has the session helped to answer the question 'why the fuss'?
- 3) Will it have helped you and colleagues to plan for ESDGC to permeate the whole of your courses rather than simply being an add-on?

These were not simply yes/no questions, spaces were left for participants to write constructive comment and they were encouraged to do so. The large majority in all these sessions answered yes to all 3 questions. The lowest numbers, though still the majority (66%), were from the morning Secondary session at Swansea. They were much more positive, however, after the afternoon subject specific sessions, and this probably reflects Secondary teachers focus on their own subject.

Specific comments tended to demonstrate that even with this audience, specifics were appreciated:

Newport

'The demonstrations were particularly useful - a reminder of just how persistent one has to be to establish ideas which are counter intuitive'.

'Investigations and websites were invaluable'.

'One of the better training days we have had, I feel much more confident about delivering the ESDGC agenda.'

Swansea

'Valuable to colleagues who had little prior knowledge of ESDGC and it's application within subject areas'.

‘Learnt a lot about how to integrate these concepts into my subject area’.

‘Maths session very useful’.

‘Economics of SD was a very thought provoking session’.

Trinity

‘An effective stimulant to action, today will be the start of some important changes to the ITET course’.

‘Left me feeling much less worried about implementing ESDGC’.

‘We will continue today’s very useful discussion’.

UWIC

‘Helped to reflect on some key principles that might have been taken for granted/as read - both in terms of school and university’.

‘Very informative, even inspiring morning goading us into the necessary action, thank you’.

‘This was a very informative stimulating and interesting session. Interactive/group activities really useful - got a lot from it’.

‘Very useful illustrations to make us think about the issues - good to have opportunity to discuss ideas with colleagues’.

In those institutions which had already experienced input, the questions were different:

- 1) Was the workshop as a whole worthwhile?
- 2) Which aspects, if any, of the workshop did you particularly enjoy?
- 3) Were there any aspects you did not enjoy? If so, what and why?
- 4) Do you have any comments/suggestions?
- 5) Will you take any action as a result of the workshop?

‘The engagement at an intellectual (rather than purely practical) level.’ ‘Discussion about Welsh language issues vis a vis language issues in Africa - seeing answers from Kenya provided a really interesting perspective.’

‘No preaching just exploring ideas.’

‘Making use of relevant examples from across the world, instead of just dealing with abstract examples.’

‘The professional framework: Discussing situations which are relevant to us here in Wales, and seeing the worth of discussion and open-mindedness in dealing with these issues.’

“Teachers in and with the wider world” was excellent especially with the chance to discuss with other staff.

‘I have taken away ideas for incorporation into my future GC/ESD sessions. That's what I wanted.’

North East Wales Institute

‘Good to have a practical focus on the challenge of inter-disciplinary issues.’

‘This was a real help in making us face the issues raised by global citizenship, and how we might integrate this concept into our teaching.’

‘A very useful opportunity to reflect on what we teach and to place it in an ESDGC context, especially in the light of inspection requirements.’

Conclusion

The aim of the second project was to provide a professional training programme for ITET staff at different levels.

Overall this was a very successful project which met the key objective. The response of staff was very positive and there was a general view that this would help the introduction of ESDGC into ITET. Those who were involved were positive about the training offered, and there was a clear view from them that such training was badly needed. Some indicated that, before the training, they had felt ill prepared for the introduction of ESDGC. It was also clear that whilst a theoretical base is necessary, even for university lecturers, practical examples were a real stimulant.

What has become clear from the training is not only how much this programme was needed, but also how much more is necessary. This project has only scratched the surface and a programme of CPD needs to be established in all institutions if ESDGC is to become a reality.

The inspection process will also be a key element in the implementation of the ESDGC agenda. It was clear from comments expressed verbally at several of the sessions, that some of those attending were doing so primarily to prepare for future inspections. If these inspections are thorough then this will help to drive the agenda forward. The question is, ‘who trains the inspectors’? If such training does not occur, then this is bound to have an effect on the process of implementation.

Appendix 1

On 1 July 1999, the UK Government transferred powers from the Secretary of State for Wales (a minister in the UK Government based in London) to the National Assembly for Wales (based in Cardiff). The National Assembly was given responsibility for policies and public services formerly exercised by the Welsh Office (a UK Government institution). These include economic development, agriculture, industry and training, education, local government, health, social services, housing, environment, transport and the Welsh language.

Education legislation contained in Acts of Parliament applies to both England and Wales. To some extent this continues, but the National Assembly for Wales now has the power to implement policy in a range of areas including education and training. In practice this means, for example, that the Assembly is responsible for setting the content of the National Curriculum for Wales.

Appendix 2

Training Schedule

Venue	Date	Session
Newport	4.7.05	Half day introduction to ESDGC Dr Keith Ross, University of Gloucestershire
Bangor	4.7.05	Full day to further embed previously delivered strategies on ESDGC Nick Clough, University of the West of England, and Sheila Bennell, World Education Centre
NEWI	5.7.05	Full Day - building on previous work Training in preparing students & mentors to Incorporate ESDGC in Block School Experience training in pedagogical tools for ESDGC Harry Blee, The Citizenship Unit, Glasgow University

UWIC	13.7.05	Full day introduction to ESDGC Dr Keith Ross, University of Gloucestershire
Trinity	14.7.05	Half day introduction to ESDGC Dr Keith Ross, University of Gloucestershire
Swansea	9.9.05	One day: A half day introduction The second half of the day subject clusters Maths/IT Professor Paul Ernest, University of Exeter Science/DT Dr Keith Ross, University of Gloucestershire History/Geography/Business Studies John Sloman, Director of Economics Network, University of Bristol English/Welsh/MFL Ann Gregory, Comenius Centre, York St John.
NEWI	28.9.05	Pedagogical issues for staff and year 3 students 4 specialist groups: English, Maths, Science, Early Years The Citizenship Unit of Glasgow University
Bangor	3.10.05	Half day focus on ESDGC for Secondary PGCE staff and students Sheila Bennell, World Education Centre

Bangor	4.10.05	Half day focus on ESGC for D&T Sheila Bennell, World Education Centre
Aber	5.10.05	Half day introduction to ESGC for staff and students
Bangor	10.10.05 17.10.05	Half day focus on ESGC for Primary PGCE Half day focus on ESGC through the medium of Welsh Eirian Samuel - Christian Aid, Kate Wolstenholme - CWEC Cymru, Sheila Bennell - World Education Centre
Newport	2.11.05	Full day for staff and Y3 - 4 groups rotating through 4 areas Forest Schools Lucy Kirkham, Sheena O'Leary, Forest Schools Children's rights Paul Johnston, UNICEF Global Footprint Glenn Strachen, PP4SD Global Citizenship Janie Pridham, Global Connections
UWIC	10.1.05	Full day for staff and school mentors - 4 groups rotating through 4 areas Forest Schools Lucy Kirkham, Sheena O'Leary, Forest Schools Children's Rights Don Harrison, Save The Children; Berit Oestch - Amnesty

		<p>International</p> <p>Global Footprint</p> <p>Ann McGarry, CAT</p> <p>Global Citizenship</p> <p>Janie Pridham, Global Connections; Eirian Samuel, Christian Aid</p>
All Wales	24-27.1.06	<p>Four days training in level 2 of Philosophy for Global Citizenship for ITET staff and school mentors</p> <p>Karin Murriss, Dialogue Works; Joanne Haynes, Plymouth University</p>
Trinity	31.1.06	<p>Full day on ESDGC through the medium of Welsh</p> <p>Eirian Samuel, Christian Aid</p>

Institutions referred to

Aber	University of Wales, Aberystwyth
Bangor	University of Wales, Bangor
NEWI	North East Wales Institute
Newport	University of Wales, Newport
Swansea	University of Wales, Swansea
Trinity	Trinity College, Carmarthen
UWIC	University of Wales Institute, Cardiff

Epilogue

At the start of this project it became quickly evident that it would be necessary but not easy to find a common concept that could be used as a framework to facilitate the integration of ESD in the curricula of teacher training institutes. One important reason for this was the partnership itself, which consists of no less than 15 partners from 8 different European countries.

From the first transnational meeting, it became clear that a lot of energy should be invested in the development of this framework, as it would become the common language around which the rest of the project would be build. Only by the second half of the project, this framework received a more or less stable character. But notwithstanding the difficulties we met during the many discussions, this process is considered by all partners as a very rewarding one. Therefore, the result of this process, which became the CSCT model, appears on the front page of this report.

As already mentioned the partnership was very broad and varied: some partners already had a lot of experience regarding ESD, others just started thinking about the integration of ESD in their own organisation. But this diversity also turned out to be the richness of the project: all partners felt they could make a significant contribution to the final result of this project.

We hope that the results of the CSCT project may inspire teacher training institutions, which have no experience with ESD, to start a broad discussion within their organisation about the desirability to integrate ESD in their curricula. And the case studies may also convince those teacher trainers who are sceptic about the feasibility of it.

For institutions which have already a tradition of dealing with ESD, we hope the results of this project may be a source of inspiration to add innovative elements to their existing curricula.

The partners would be glad to hear the comments of the reader of this report and especially of those for whom this project was a source of inspiration for their own project or curriculum reform. After all, sharing knowledge is essential for learning for ESD.