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**HOW DO TEACHERS TEACH SUSTAINABLE DEVELOPMENT? – A PANEL ON
COMPETENCE IN ESD IN THE EDUCATION SECTOR**

**DISCUSSION PAPER
ON COMPETENCE IN EDUCATION FOR SUSTAINABLE DEVELOPMENT
IN THE EDUCATION SECTOR**

Note by the secretariat¹

What to teach? How to teach? Where to teach?

These are the questions that need to be answered in order to better understand the issue of competence in education for sustainable development (ESD) and to advance in developing competences in ESD in the education sector, thereby supporting the practical implementation of ESD.

The UNECE Steering Committee on ESD is invited to discuss and propose how to improve competences in ESD, including through:

- (a) Mechanisms at the policy level;
- (b) Capacity-building and awareness-raising activities;
- (c) Financing and economic incentives;
- (d) Other related issues.

¹ This document was prepared in consultation with selected experts and members of the Bureau. To allow for this consultation, the document was submitted on the above date.

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Introduction

1. The joint session on education for sustainable development (ESD) held at the Sixth Ministerial Conference “Environment for Europe” (Belgrade, 10–12 October 2007) identified the competence of educators as a frequent bottleneck vis-à-vis improving the quality of education and agreed that one priority for future implementation of the UNECE Strategy for ESD should be developing competences in ESD. The Bureau of the UNECE Steering Committee on ESD agreed to organize a panel discussion during the third meeting of the Committee to address the issue of developing competences in ESD in the education sector.

2. This paper is based on the relevant documents and reports developed thus far within the ESD process and aims to identify pertinent questions and raise issues for discussion by the panel. At this stage, few studies are available regarding competences in ESD. One of the most comprehensive is the CSCT² project, an effort to develop a framework for teacher training in ESD to be carried out in partnership by various institutions. The outcomes of this project could serve as background material for considering the issue of competence in ESD in the education sector. (Information on the reference materials that served as a basis for this paper can be found on page 10.)

² Curriculum, Sustainable development, Competences, Teacher training (CSCT). Detailed information is available on the CSCT website (<http://www.csct-project.org/content/view/1/26/>).

I. WHY DO WE NEED COMPETENCE IN ESD?

3. Although sustainable development (SD) is not a scientific concept, enabling the understanding of different interactions in relation to it is crucial. Decision makers and ordinary citizens would benefit from learning more. With the need for education for a democratic and sustained future, the following four pillars were recognized as the foundation for education: learning to live together, learning to know, learning to do and learning to be³. Countries in the UNECE region have committed to incorporating SD themes into their formal education systems, in all relevant subjects, as well as in non-formal and informal education. SD is a complex and continuously evolving concept, with a tight interconnection between the social, economic and environmental pillars and a variety of key themes⁴. Therefore, its promotion in the education sector entails a holistic and systemic approach as well as specific knowledge, skills and competences.

4. Most countries have already taken significant steps towards implementing ESD, but the issue of adequate competences in ESD remains a significant prerequisite. Good practices in ESD in the UNECE region collected for the Belgrade Ministerial Conference mostly focused on integrating ESD content into curricula and training. However, ESD involves entirely new approaches to teaching and learning, and good practices on this aspect, which is a vital component of competences in ESD in the education sector, are almost non-existent.

5. One of the objectives of the UNECE Strategy for ESD is to equip educators with the competence to include SD in their teaching. Progress in implementing the Strategy thus far shows that ESD implementation has been hindered by the lack of ESD competences among staff, and that a major challenge is the initial training and re-training of current educators, leaders and decision makers in the education sector. This training should include a reorientation away from focusing entirely on providing knowledge towards addressing problems and identifying possible solutions. Providing opportunities for educators to share experiences are extremely important for the success of ESD, as are new competences for both educators and learners (i.e. systemic thinking, visioning, using multiple perspectives and problem-solving) and new core areas for quality assessment and enhancement.

³ “Learning: the treasure within”, a report addressed to UNESCO in 1996 by the International Commission for Education for the Twenty-first Century.

⁴ Key themes of SD include, inter alia, poverty alleviation, citizenship, peace, ethics, responsibility in local and global contexts, democracy and governance, justice, security, human rights, health, gender equity, cultural diversity, rural and urban development, economy, production and consumption patterns, corporate responsibility, environmental protection, natural resource management, and biological and landscape diversity (CEP/AC.13/2005/3/Rev.1).

II. WHAT ARE THE MAJOR CHALLENGES?

A. Understanding and defining competence in ESD⁵

6. The concept of competence is complex, can be understood in various ways, and is often confused with “qualification” or “standard”. Competence as a holistic notion is a multi-dimensional concept. It can be broadly defined⁶ as the state or quality of being adequately or well qualified, or possessing a specific range of skills, knowledge, or abilities. Defining competences is thus an ethical and political assignment. In the educational context, competence is traditionally restricted to the cognitive dimension. Demonstration of competence or effective action implies the mobilization of knowledge, cognitive and practical skills as well as social and behavioural components (abilities, emotions, values and motivation). The concept of collective competence is vital, as it serves the demand of ESD far better rather than the individual competence (it seems unlikely for a single person to possess all components needed for SD competence).

7. Competences are described as learnable but not teachable. Thus the question arises of whether and how they may be acquired via learning programmes. There is a distinct connection between competency concepts, educational framework conditions, the training of teachers and the shaping of learning processes. One important distinction is that competence-oriented education focuses on the output of the desired educational processes, whereas conventional didactic approaches focus on input (i.e. content and subjects). The output approach asks not what should be taught, but what should be learned, what are the abilities needed for action, and which concepts and problem-solving strategies learners should acquire. The acquisition of action competence is quite different from that of “inert knowledge”.

8. Competences do not exist per se but always relate to a certain desired output. The demand-oriented approach (the results an individual achieves through action, choice or behaviour connected with the demands of the particular profession, social role or personal project) has to be combined with and complemented by the definition of the internal structure of a competence (knowledge, cognitive and practical skills, attitudes, emotions, values and ethics, and motivation, e.g. the ability to cooperate). Identifying the internal structure of a competence can help define the prerequisites for acquiring that competence, e.g. creating tasks and manuals for learning the competence, as well as creating the necessary learning conditions.

9. Competences are also social constructs based on values and ideological assumptions. It is important to focus not only on personal abilities and motivations, but also to take context into account. Support structures need to be created in which the competencies can be used. Since competencies are by nature complex and manifest themselves only in actions and behaviour

⁵ Please refer to the final report of the CSCT project for more details: http://www.csct-project.org/component/option,com_docman/Itemid,42/.

⁶ One competence-related definition states that “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), as referred to in the CSCT project.

within a given context, their application can only be observed and measured indirectly.

10. The concept of shaping competence refers to the skill of applying knowledge about SD and recognizing problems about non-sustainable development. This means being able to draw conclusions about ecological, economic and social developments and their mutual interdependency based on analysis of the present and studies about the future. From these conclusions, the person concerned should be able to take decisions which he/she can translate into political action both as an individual and as a member of a community.

11. One related concern is that it requires changing the priorities on the systemic level of the educational system to enable acquisition of certain competences such as interdisciplinary thinking and teaching, as well as skills such as communication and project management. These competences could be made more central for all teachers and learners by changing the curricula and introducing new teaching principles or reinforcing already existing teaching principles. A further concern is that norm-setting requires a change in both the educational culture and the assessment culture to be able to properly evaluate the actual practice of teachers and learners.

12. The CSCT project developed a common conceptual framework for a competency-based ESD curriculum for initial and in-service teacher training institutions. The framework strongly emphasizes the interdisciplinary approach and can be adapted to the institutions' local context. The project outcomes also include a range of case studies describing relevant competences, contents and methods. Five competence domains were identified:

(a) *Knowledge* – conceptual, factual and action-related knowledge as defined in relation to ESD. Knowledge relates to time (past, present and future) and space (local and global). It is inter-, trans-, pluri-, or cross-disciplinary and takes into account the social structure as a result of being informed by individuals' life experiences. "Content knowledge"⁷, "pedagogical knowledge"⁸ and "pedagogical content knowledge"⁹ are used for classifying different knowledge-related competences.

(b) *Systems thinking* - Thinking in systems is required in our complex and interconnected world. Analytical and reductionistic thinking are insufficient for solving current problems and ensuring a sustainable future. The awareness that human beings are part of broader "subsystems" and Earth is part of "the global system as a whole" is central to ESD. This awareness need to encompass ecology, economy and society.

(c) *Emotions* - Thinking, reflecting, valuing, taking decisions and acting are inseparably tied with emotions. Thus, emotional competence is indispensable for ESD implementation. Empathy and compassion play a key role and feelings of inter-connectedness with the world is a prerequisite for ESD.

⁷ "Content knowledge" encompasses the theories, principles and concepts of a particular discipline. In relation to SD it refers to issues such as climate change, poverty distribution, desertification, etc., as well as understanding of inter- and intra-generational solidarity, the precautionary principle, etc..

⁸ "Pedagogical knowledge" refers to the general knowledge teachers have about teaching methods.

⁹ "Pedagogical content knowledge" is an individual teacher knowledge based on the manner in which teachers relate their pedagogical knowledge to their subject matter knowledge, i.e. in which teachers transform and represent subject contents and ideas in a way that they make sense to their pupils or students.

(d) *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, etc.).

(e) *Action* - Action is the process in which all the competences for the other four domains merge, enabling participation and networking in SD and resulting in meaningful projects. Action requires additional practical skills, abilities and competences in the field of project management and cooperation. Four levels of action need to be taken into account for a successful ESD, i.e. individual, classroom/school, regional and global. Action entails experiencing conflicts of interest, change, participation, learning from mistakes, synergies and success. Actions must be chosen wisely, as they serve to increase the motivation for further learning and continuing action.

13. For each of these five domains, required competences in ESD were developed on three different levels:

- (a) The teacher as an individual – connected with reflection and visioning;
- (b) The teacher in the educational institution – connected with teaching and communication;
- (c) The teacher in the society – connected with cooperation and networking.

14. A dynamic model has been developed for these ESD competences in teacher education (see annex 1).

B. Building competence in ESD

15. Concerning the key SD themes currently addressed at the various levels of formal education, it is largely the environmental component of ESD that has been adopted by educational institutions. In most cases, subjects are of a purely environmental nature – mainly air and water pollution, waste management and energy conservation – and this holds especially for the countries of Eastern Europe, Caucasus and Central Asia (EECCA) and South-Eastern Europe (SEE). If in some countries (e.g. Finland, Greece, Hungary, Kyrgyzstan, and the Netherlands) a more integrative concept of ESD is emerging, in the majority the social and economic components of ESD are still almost non-existent. Environmental topics seem to be addressed at all ISCED¹⁰ levels, whereas topics such as poverty alleviation, ethics and philosophy, human rights, citizenship, corporate social responsibility, economics and rural/urban development tend to be covered at the higher education levels only.

16. In general, none of the strategies to implement ESD in formal education (e.g. through existing subjects only, using a cross-curriculum approach, providing specific subject programmes or as a stand-alone project) is more developed than any other. There are differences between subregions, however: EECCA countries tend to focus more on integrating ESD issues into existing subjects, e.g. ecology, social studies, economy and various sciences, whereas the European Union countries and other Western European countries follow more of a cross-curricular approach.

¹⁰ International Standard of Classification of Education.

17. Little has been done vis-à-vis developing quality assessment of learning outcomes in terms of meeting ESD-related criteria. Current quality assessment and accreditation schemes still focus on traditional learning outcomes such as discipline-oriented knowledge. Some examples of developments can be seen, however. The Czech Republic, for instance, has developed an award scheme related to the eco-footprint of schools. Greece uses the Eco-management and Audit Scheme, and Norway has developed a toolbox which offers support to schools and teachers in how to teach about SD (see annex 2).

18. In summary, the countries of the UNECE region face the following challenges in building competence in ESD:

(a) *No agreed definition of ESD-related competencies (the major challenge).* Each country must adapt competences to some core requirements – e.g. systemic and interdisciplinary thinking, visioning and use of multiple perspectives – taking into account local and indigenous knowledge but at the same time pressing global issues such as human rights, climate change, health security, loss of biodiversity, and the introduction of genetically modified organisms. With respect to addressing this challenge, given that SD is not fixed goal but a developing and process-oriented concept, a better option is to define a framework of competences in ESD;

(b) *ESD is not part of the educators' initial training.* In most countries, ESD is part of teachers' in-service training rather than their initial training. In addition, hardly any countries reported having integrated ESD into the training of leaders and administrators of educational institutions.

(c) *In-service training is mainly or exclusively focused on topics related to the environment.*

(d) *Teachers' salaries are low and there is a lack of economic incentives to tackle this problem.* While these problems affect the education sector generally, they nonetheless contribute to poor implementation with respect to developing competences in ESD. The problems of low salaries and lack of economic incentives apply throughout the entire region, but are particularly acute in EECCA and SEE countries.

19. Introducing ESD into initial and in-service training requires development of (a) educational programmes and didactic tools for ESD in primary and secondary schools; (b) “train-the-trainers” programmes in ESD; and (c) methods to evaluate students' knowledge of SD. Two key things should be emphasized here. First, the quality and availability of instruction materials are vital. ESD materials are currently not available in all countries; therefore, considerable efforts should be devoted to developing, reproducing and distributing them. Second, to achieve these related goals, the most efficient way to build competence in ESD seems to be through establishing appropriate training during the initial teacher training.

20. In addition to possessing competences in ESD, the educational institution as a whole – including students, teachers, managers, other staff and also parents – should follow the principles of ESD. Many countries are currently evaluating the “whole institution approach”¹¹, a relatively

¹¹ A “whole institution approach” means that all aspects of an institution's internal operations and external relationships are reviewed and revised in the light of SD and ESD principles. Within such an approach, each

new concept which requires the questioning of existing routines and structures. Certain countries, especially those in the EECCA and SEE subregions, are even assessing how this approach could be adopted in their national institutions. But on the whole, only in some countries have schools adopted the “whole-institution” approach, and these comprise only a minority of all educational institutions.

III. HOW TO IMPROVE THE SITUATION?

A. Approaches to integrating ESD in the education sector

1. What to teach?

21. The teaching of ESD should focus on SD as a subject, providing insights into global, regional, national and local environmental problems, explaining them by means of a life-cycle approach, and focusing on environmental impact and on the economic and social implications. At the same time, ESD should also emphasize teaching methods, as it involves a reorientation away from simply providing knowledge towards facing problems and identifying possible solutions.

2. How to teach?

22. Teaching often receives much less attention than domain knowledge. Teachers of ESD need more than just knowledge about SD and its key themes, they must be able to integrate them into other subjects, since addressing the diverse themes in ESD requires a holistic approach. ESD teachers should likewise possess the appropriate methodological competence to be able to reorient from being solely transmitters of knowledge to learners to forming a team with the learners. These new approaches to teaching and learning involve, inter alia, (a) a shift from top-down curriculum planning towards active participation of students in negotiating the content and nature of their own learning; and (b) a shift from transmission of knowledge to the formation of values among pupils. The competence concept implies a switch from input to output orientation with the aim of measuring educational gains. Educational planning of contents and methods (input) by the teachers for the learners should state which learning goals are to be aimed for, which competences (output) the learner should acquire, and how these goals and competences can be reached.

3. Where to teach?

23. Ideally, the development of ESD competences should take place with the initial teacher training as well as in the re-training of educators. At this current starting stage of ESD implementation, however, the process of developing competences in ESD is best focused on initial training rather than on in-service training, as the latter seems to have high cost implications. Hence, the target institutions should be the international and national institutions dealing with the initial training of the future educators.

institution would decide on its own actions, addressing the three overlapping spheres of Campus (management operations), Curriculum, and Community (external relationships).

B. Possible options for action

24. Since the lack of competence in ESD is a vital issue of concern for most countries of the UNECE region, ESD activities should be promoted at the regional, subregional and national levels. Below are a range of possible actions at each level.

25. At the regional level, one option is to focus on policy by preparing a set of recommendations or guidelines on competence in ESD addressed to different target groups (e.g. decision makers, competent authorities/institutions, teachers). Another option would be to develop a learning model programme on competence in ESD under the leadership of UNESCO¹² which takes into account the results of the CSCT project. These two proposals could be addressed by the establishment of a group of experts with defined terms of reference for its work.

26. At the subregional level, activities could comprise joint case studies or pilot projects to develop subregion-appropriate special training programmes as well as trainings and workshops. For instance, the first subregional workshop for SEE¹³ countries (Athens, November 2005) proposed a programme with two interlinked key elements: (a) “creating a critical mass” (i.e. training trainers); and (b) developing teaching materials. The SEE subregion could implement this follow-up activity as a pilot programme with a view to extending it to other UNECE subregions. The training of trainers could focus on defining ESD, on ESD learning and instruction processes and methods, and on ESD curriculum integration strategies. The pilot programme could be organized with the support of the UNECE secretariat in close collaboration with UNESCO and other relevant partners. International experts with experience in this field could be invited to conduct the training.

27. At the national level, countries should strive to fulfil their commitments with respect to implementing the UNECE Strategy for ESD and should put greater emphasis at the national level on initiating activities to develop competences in ESD. Here options for implementing ESD could include: (a) organizing workshops for exchange of experience at the international level; (b) having interested countries serve as pilot countries to test a learning model programme and share their experiences and lessons learned in doing so; and (c) initiating case studies at the policy and institutional level to develop competences and integrate ESD. One example is the “Here and Now. Education for Sustainable Consumption (ESC)”, an initiative of the Italian Task Force on ESC in cooperation with the United Nations Environment Programme and UNESCO. The activities of “Here and Now” include developing guidelines and recommendations to introduce sustainable consumption and production (SCP) into formal learning processes, including generating core curricula on ESC. SCP is a core element of SD and in many cases represents a solution e.g. in terms of individual behaviour and technological innovation, for achieving SD principles and targets. Building competences in ESD represents an overall framework within which initiatives such as ESC can provide practical added value. The outcomes of this initiative could then be shared with other countries, as well as adapted to specific local needs and tested by interested Parties.

¹² The United Nations Educational, Scientific and Cultural Organization.

¹³ In this context the reference to SEE subregion also includes the Mediterranean subregion.

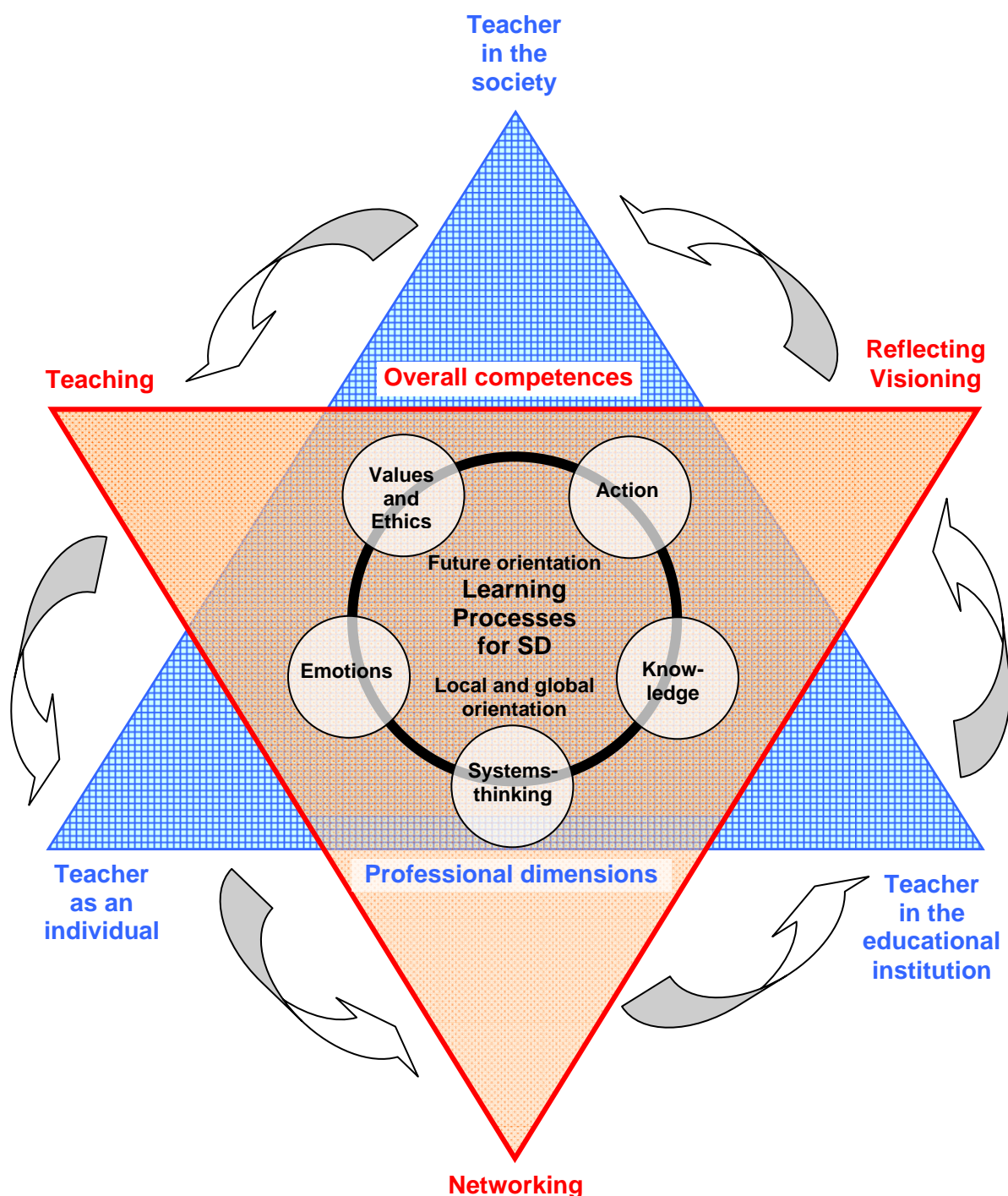
28. Possible financial mechanisms and economic incentives and options to support building competence in ESD at the national and local levels could include allocating funds to develop learning programmes and materials; establishing award schemes for institutions that have adopted a “whole-institution approach”, and initiating various marketing activities to support and promote competences in ESD.

References:

- UNECE Strategy for ESD (CEP/AC.13/2005/3/Rev.1).
- Vilnius Framework for the Implementation (CEP/AC.13/2005/4/Rev.1).
- Explanatory notes to the Strategy (CEP/AC.13/2004/8/Add.2).
- First progress report in implementation of the UNECE Strategy for ESD “Learning from each other: achievements, challenges and the way forward” (ECE/BELGRADE.CONF/2007/INF/3 – ECE/CEP/AC.13/2007/2).
- Needs for the implementation of the UNECE Strategy for Education for Sustainable Development, (ECE/CEP/AC.13/2008/11, <http://www.unece.org/env/esd/belgrade.htm>).
- Joint Statement on ESD by Ministers of Education and of Environment (ECE/BELGRADE.CONF/2007/4/Add.1).
- Chair’s Summary of the Sixth Ministerial Conference “Environment for Europe” (ECE/BELGRADE.CONF/2007/9).
- Chair’s Summary of the joint session on ESD (ECE/BELGRADE.CONF/2007/4/Add.3)
- the pilot reports submitted by UNECE Member States (available at: <http://www.unece.org/env/esd/Implement.Gov.htm>).
- The publication of good practices in ESD (ECE/BELGRADE.CONF/2007/INF/9, collected good practices are available at: <http://www.unece.org/env/esd/GoodPractices/index.html>)
- The outcomes of the CSCT project on Competences for ESD teachers: a framework to integrate ESD in the curriculum of teacher training institutes (Comenius 2.1 project 118277-CP-1-2004-BE-Comenius-C2.1, http://www.csct-project.org/component/option.com_docman/Itemid.42/).
- SUSTAIN.NO - an educational tool for sustainable development (www.sustain.no)

Annex I

I. CSCT FRAMEWORK: DYNAMIC MODEL FOR ESD COMPETENCES IN TEACHER EDUCATION¹⁴



¹⁴ The model was developed by the CSCT project.

II. HOW TO READ THE MODEL

A. Blue triangle: Professional Dimension

1. 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.

B. Red triangle: Overall Competencies for ESD

2. There are three overall competencies:

- (a) Teaching;
- (b) Reflecting/visioning;
- (c) Networking.

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

4. 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 – teaching, instructing and communicating – will change as ESD develops. Besides the communication within the educational institution publication of projects and efforts are crucial (e.g. exhibitions, theatrical productions, songs, print media, webpages) so that parents and the community are invited to take part in this school-based process.

5. The second two competences should have even greater emphasis in ESD, because ESD has to take into account an orientation towards the future as well as a 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 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 for fostering such reflection and visioning in order to improve teacher competencies.

6. ESD as a common concern has to be realized within an interdisciplinary team. No one can tackle 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 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. In addition, with networking and publishing, competencies are also important (compare with the section on teaching).

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

C. How to read the model

8. The relationship between the professional dimensions and the overall competencies refer to all the possible combinations. The two triangles should be regarded as flexible.

9. Opposite angles have the strongest relationship with each other.

10. Examples:

(a) The teacher in the educational institution especially needs competences in teaching, communicating and mediating on various levels, such as with students, teacher colleagues, leadership and the educational board.

(b) But this is not sufficient. For ESD, you need as an individual teacher to be able to create and formulate visions based on reflective activities.

(c) 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 rely on competences such as networking, cooperation and publishing.

But also:

(d) 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

11. 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.

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

Annex II

TOOLBOX FOR SCHOOLS AND TEACHERS ON HOW TO TEACH ABOUT SD (NORWAY)

1. In Norway it was realized that schools need support to provide effective ESD, and that a national support system for ESD should include:
 - (a) Teacher training;
 - (b) National curriculum;
 - (c) Formalized intersectoral cooperation, nationally and locally;
 - (d) Users for information produced by schools.
2. All of these elements can be effectively implemented through use of ICT¹⁵ in a Web-based support network for schools.
3. More on the Norwegian approach can be found on the Network for Environmental Education website (www.miljolare.no; in English, www.sustain.no).
4. The network concept is illustrated in the figure below.
5. Schools use the Web-based network to share information, to present their projects, and to find background materials, contacts and inspiration. First, the school, class or student plans their project in cooperation with local priorities and with input from local actors such as the municipality. They include one or more activities from the network. Students investigate an area or subject by observing, interviewing, writing, measuring, discussing and analysing their findings. They then enter their findings in the national database in the form of data submitted on standardized forms or written project reports and photographs. The students can get feedback on their work both from other schools working on similar topics and from experts at universities and research institutions. The school, teachers and students all develop their competence when using this toolbox.

¹⁵ Information and communications technology.

