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Learning to Shape Transformation – How Individual Schools can be Supported in Implementing a Newly Developed ESD Curriculum with Training Concept

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Abstract

When implementing projects in the field of education for sustainable development (ESD), there is always a great need for further training and qualification for the teaching staff if ESD needs to be implemented systematically and school-wide in the lessons of all year groups and subjects. Successful implementation of ESD in the school context depends on two influencing factors. On the one hand, schools need a practicable framework curriculum for ESD and, on the other hand, a related further education concept that can be implemented primarily in school practice.

The main aim of the article is to outline the framework curriculum and the training concept and to present the initial results of an evaluation of the training carried out on this basis in a Latvian, Romanian and German schools.

This article reports on an ERASMUS + project that has dedicated itself to this task from a European perspective. Building on the framework curriculum, a customized training concept was developed to impart content and skills for teachers and educational staff. Both the framework curriculum and the training concept as well as the handout can be downloaded free of charge in six languages: <https://esdsupervision.eu/>.

The most important finding of the project is that the curriculum framework and the training program tailored to it are seen as effective and efficient, but also that accompanying advice is necessary for a school development process.

Keywords: Education for sustainable development, great transformation, teacher education, teacher training, school, ESD curriculum

Introduction and Theoretical Background of the Framework Curriculum and Training Concept on ESD

The United Nations Agenda 21 (UN, 1992), is a comprehensive plan of action to be implemented at global, national and local levels, emphasizing the leading role of

education in achieving sustainable development. It is also crucial for teaching values and attitudes, skills and behaviors associated with sustainable development as well as effective public participation. Sustainable development will be seen as a constant process of learning and reflection. Therefore, the understanding of development needs and priorities may change with experience. The *2030 Agenda for Sustainable Development* (2015), which was adopted by all member states of the United Nations, offers a common blueprint for peace and prosperity for all people - including future generations. At its heart are the 17 Sustainable Development Goals (SDGs), including SDG4, a special goal for education. Education for sustainable development (ESD) is an integral part of high-quality education. It promotes the cognitive, social, emotional and behavioral dimensions of learning. UNESCO has been the lead United Nations organization for ESD since the *UN Decade of Education for Sustainable Development (2005-2014)*. The overarching goal of the Decade was to integrate the principles, values and practices of sustainable development into all aspects of education and learning. Its main contribution was awareness raising, which contributed to the development of interesting practices and projects. The evaluation of the Decade recommended, among other things, that institutional support is needed to expand and sustain these important initiatives. The *UNESCO Global Action Program on ESD 2015-2019* (UN, 2013) defines five areas of action:

- 1) Driving the policy forward
- 2) Redesigning the learning and training environment (whole institution approach)
- 3) Capacity building for teachers and trainers
- 4) Strengthening and mobilizing young people
- 5) Accelerating sustainable solutions at local level.

How to encourage learners to take transformative action for sustainability is thus a key concern of ESD, which is essentially citizenship in action. ESD refers to the perspective of lifelong learning that takes place not only in school, but also outside the school environment, throughout each individual's life (UNESCO, 2019). Therefore, ESD encompasses both formal and non-formal education, which indicates that schools need to network within their regions but also beyond. The new 2030 guide, *Education for Sustainable Development: A Roadmap* (UNESCO, 2020), focuses on the role of education in achieving the 17 Sustainable Development Goals (SDGs) through the implementation of SDG 4 and in particular target 4.7:

"4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and the contribution of culture to sustainable development." (UN, 2015, p. 19).

SDG target 4.7 shows that ESD and civic engagement must be considered together. The European Union (EU) strategy *The European Green Deal* (2019) states: "Schools, training institutions and universities are well positioned to engage with pupils, parents and the wider public on the changes needed for a successful transition." The recent *proposal for a Council Recommendation on Learning for Environmental Sustainability*

(EU, 2022) suggests embedding environmental sustainability in all education and training policies, programs and processes to build the skills and competences needed for the green transition and contribute to UNESCO's *ESD 2030 Roadmap*. However, ESD is not to be equated with environmental education, but is more holistically understood as transformative education. That means to design teaching and learning to motivate and empower happy and healthy learners to make informed choices and actions at individual, community and global levels (UNESCO, 2022a). *The Future of Education and Skills 2030* (OECD, 2020) document drawn up by the Organization for Economic Cooperation and Development (OECD) identifies three categories of transformative skills:

(1) Creating new value, (2) Coping with tensions and dilemmas, (3) Assumption of responsibility.

These transformative competencies are complex and should therefore be translated into a set of specific constructs (e.g. creativity, critical thinking, responsibility, resilience, collaboration) to better incorporate them into curricula. In summary, the focus for the implementation of ESD in the individual school is on transforming it into a sustainable organization in the sense of the Whole Institution Approach and networking the school with the region as well as the interdisciplinary integration of sustainability and correspondingly coordinated basic, advanced and further training for teaching staff.

Methodological Background of the Development of the Curriculum and Training Concept

Research and Development Design

The basis of the ERASMUS project “ESD SuperVision 4.0” presented here is a systematic comparison of various documents on ESD at international and national level, such as framework curricula of the various EU countries on the subject of ESD as part of a document analysis.

The extent to which the curriculum can then be communicated to teachers and the extent to which it is helpful in initiating a school development process towards ESD in their own school was subsequently evaluated. The evaluation research design is primarily based on the analysis of individual interviews, focus group interviews and a small quantitative survey. The evaluation was both formative in the sense of action research and summative at the end.

Document analysis: The document analysis made it possible to work out the structural, content-related and pedagogical-didactic differences and similarities of framework curricula as they are discussed in the global discourse on ESD and specified as school law guidelines in various national education systems. The aim of the document analysis was to develop a transnational guide for schools to develop their own ESD curriculum within the framework of the whole institution approach, which can be implemented locally for individual schools. To this end, a document corpus of relevant documents from the UN and its various organizations (OECD; UNECE; UNESCO) and the EU as well as the national ESD framework curricula of the countries involved in the project (Germany; Italy; Latvia; Lithuania; Romania; Czech Republic)

was first compiled. The following documents were included in the analysis and thus indirectly in the developed European framework curriculum:

Table 1

Documents Included in the (development of the) European framework curriculum

Global discourse
IISD (2011) Guide for sustainable school in Manitoba North American Association for Environmental Education (NAAEE) (2010). Guidelines for Excellence K-12 Learning OECD (2018). The Future of Education and Skills: Education 2030. OECD (2020) Curriculum (re)design. A series of thematic reports from the OECD Education 2030 project. OECD (2020). The Future of Education and Skills 2030. UNECE (2012) Learning for the future: Competences in Education for Sustainable Development UNESCO (1996). Learning: The Treasure Within. UNESCO (2017) Education for Sustainable Development Goals - Learning Objectives. UNESCO - MGIEP (2017) Textbooks for Sustainable Development – A Guide to Embedding https://unesdoc.unesco.org/ark:/48223/pf0000259932 UNESCO (2018) Integrating Education for Sustainable Development (ESD) in Teacher Education in South-East Asia - A Guide for Teacher UNEVOC (2020) Trends in New Qualifications and Competencies for TVET Perspectives of the European UNEVOC Network
European discourse
Bianchi, G., Pisiotis, U., Cabrera; Giraldez, M. Bacigalupo, M., Punie, Y. (ED) (2022) GreenComp – The European sustainability competence framework ENSI (2005) “Quality Criteria for ESD-Schools” - Guidelines to enhance the quality of Education for Sustainable Development EU (2018) Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning EU (2018) The European Qualifications Framework: supporting learning, work and cross-border mobility EU (2021) Education for environmental sustainability: policies and approaches in European Union Member States MetESD (2019) Curriculum Handbook - ESD in educational processes; approaches and methods Vare, P. et al. (2019) Devising a Competence-Based Training Program for Educators of Sustainable Development: Lessons Learned
National ESD-Curricula
National Strategy for Sustainable Development (Lithuania) National curriculum for sustainable development (Latvia) Romanian Strategy for ESD Decree of the Lower Saxony Ministry of Education towards ESD Guidelines for ESD -North Rhine-Westfalia

The documents were analyzed according to the criteria (Code list) (Content and objectives of ESD (dimensions of ESD), competency understanding or competency model and implementation strategies and recommendations for action), then categorized by content and coded and evaluated accordingly. The results of the evaluation were validated communicatively in two steps. Firstly, in evaluation meetings of the researchers from three participating universities (Vechta University, Germany; Charles University Prague, Czech Republic and University of Kaunas, Lithuania) as well as in online meetings together with teachers from the partner schools and teacher trainers from the Teacher Training Institute Iasi, Romania, the University of Edinburgh, Scotland and the University of Florence, Italy. In the project mentioned here, it was particularly important that the different international documents and national curricula of the participating countries (see table1) as well as the different profiles of the participating schools had to be harmonized so that a Europe-wide ESD curriculum handbook could be formulated so openly that it could be a framework or guideline, but also so concretely that schools could implement ESD efficiently as part of a school development process.

Evaluation research: The evaluation concept implemented as part of the accompanying research supports the implementation of the whole-school approach to ESD but can also be used by teachers and school administration staff as a self-assessment tool with the aim of evaluating ESD training courses and structuring self-evaluation processes. The evaluation of the training concept was only carried out by the teachers involved in the training modules. Due to the capacity of the project, 60 teachers from the participating schools in Germany, Latvia and Romania were able to take part. The developed and evaluated framework curriculum for ESD serves as a starting point for school and lesson development. The ESD curriculum was tested, evaluated and implemented in the participating schools. Steering groups were formed in each school to develop the curriculum. All participants were trained in semi-annual training courses and conferences. The project concept was shaped by six training courses each four hours long. The six training courses, designed as modules, include methodological and didactic qualification for teaching, the exchange of design ideas for school-specific ESD curricula and the discussion of basic skills in connection with sustainable development. The content of the six training units was designed to accompany the process so that the participants could reflect on and shape the specific individual design of the curriculum development process in their own school (plan - do - check - act/deming circle) (cf. Fischbach, Kolleck & de Haan, 2015).

The following six modules were offered:

- Module 1 ESD basics (learning for change)
- Module 2 Systemic thinking (learning for the future)
- Module 3 ESD didactics (learning and teaching)
- Module 4 ESD-curriculum (school development)
- Module 5 ESD assessment (evaluation)
- Module 6 Networking for sustainable schools

Central to the content of the six modules was, among other things, the teaching of activities- and student-centered methods and didactic concepts that enable a high degree of self-participation and promote motivation to learn. The guiding principle of the modules can be described as “learners learning from learners”. Teachers should

experience themselves as learners. At the end of the project, the modules were evaluated externally and modified so that they can be offered throughout Europe as an integral part of teacher training and further training, but also as part of undergraduate teacher training. The evaluation of the implementation of the European framework curriculum comprised a quantitative questionnaire with closed questions and quadruple-scaled answers as well as qualitative, guideline-based expert and focus group interviews. This article presents the data from the questionnaire survey. The questionnaire is divided into three sections.

Table 2

Sections of the Questionnaire for Evaluation

Section 1 (Evaluation of curriculum implementation)
Description: Based on "Tool 5: School and Community Evaluation Tool" proposed by UNESCO (2018) for evaluating the ESD whole systems approach
Section 2 (Evaluation of training concept)
Description: Based on an evaluation checklist that aims to determine the perceptions of participants regarding the effectiveness of the course in improving their professionalism.
Section 3 (Identification of training needs)
Description: Aims to identify possible challenges and training needs that emerge in an initial pilot phase of the course and that will be considered in the final version of the ESD training

With regard to the school-wide implementation of an ESD curriculum (Section 1), the participants were asked about five strategic dimensions:

1. ESD implementation into the formal curriculum.
2. Implementation of social dimension of sustainability.
3. Implementation of ecological dimensions of sustainability.
4. Implementation of economic dimensions of sustainability within your institution.
5. Implementation of cultural and political dimensions of sustainability.

Sampling Procedures and Sample Description

The quantitative, written survey was conducted in the respective schools over a period of two weeks and after the transnational meetings. The interviews were conducted online. The study was carried out by the Italian Association for Sustainability Science (IASS, Associazione Italiana per la Scienza della Sostenibilità). IASS is a scientific association gathering scientists, educators, experts and practitioners, established in 2013.

109 respondents within the school context took part in the quantitative questionnaire survey to evaluate the introduction of the curriculum and the training concept.

Table 3*Sample*

<i>Sample by country</i>		
Country	Frequency	%
Czech Republic	24	22.0 %
Germany	9	8.3 %
Italy	9	8.3 %
Latvia	39	35.8 %
Lithuania	3	2.8 %
Romania	25	22.9 %
TOTAL	109	100%
<i>Participants by function in the school</i>		
Role within the institution	Frequency	% in total
Administrative staff	5	4.6 %
ESD Projects Coordinator	6	5.5 %
Headmaster/Principal	7	6.4 %
Others working in ESD activities in the institution (but are not teachers)	10	9.2 %
Teacher	81	74.3 %
TOTAL	109	100%
<i>Experience of the participants with ESD</i>		
Number of years of involvement in environmental /ESD education	Frequency	% in total
Beginner	44	40.4 %
From 5 to 10 years	25	22.9 %
More than 10 years	40	36.7 %
TOTAL	109	100 %

A demographic section of the questionnaire recorded in which country (Table 1), in which position (Table 2) and how long the persons had been working in the ESD context (Table 3).

Limitations

It must be said, however, that the results are based on a small number of participants and remain at a descriptive level, like so many empirical studies in the field of ESD and teacher training (Fischer et al., 2022). Unfortunately, due to the budget, it was not possible to conduct school-related research and accompany the individual school development processes, so that only school-wide statements are possible. Furthermore, a comparison between countries is not possible for budgetary reasons, although the data would have allowed it.

Results of the Evaluation of the European Framework Curriculum and the Associated Training Concept

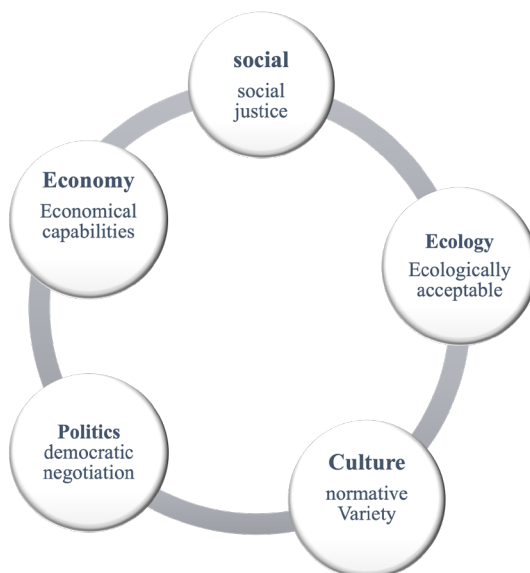
Presentation of the European ESD Framework Curriculum

A curriculum based on the acquisition, promotion and consolidation of competence faces the challenge of developing a plausible competence model that is complex enough to reflect the requirements of ESD on the one hand and to reduce the complexity to such an extent that it is manageable for implementation at the level of the individual school on the other.

Objectives and content of the European framework curriculum: The framework curriculum designed for the project is based on five target dimensions. Against the background of the systematic comparison of different ESD models, an orientation framework for the classification of ESD-relevant topics was summarized, which goes beyond the target dimensions of the three-pillar model (ecology, economy and social issues) (Scherak/Lindau-Bank/Stein 2018) and also includes the dimensions of culture and politics.

Figure 1

Content Dimensions in the Framework Curriculum



How and in which dimensions (see Figure 1) the competencies are taught, expanded or deepened is developed locally based on the respective circumstances and characteristics of the individual school. In the course of implementing a school-specific ESD curriculum, the content of the school-specific curriculum is filled in, specified in terms of subject matter and defined with regard to the 17 Global Sustainability Goals.

In addition to the content, a competence-based curriculum must also define the dimensions of learning in order to subsequently assess learning achievements. Here, the framework curriculum refers to the Delors Report to UNESCO, which describes four pillars of learning (UNESCO, 1996, 85ff). This requires open-ended, emancipatory learning processes that are appropriate to postmodern society.

Table 4
Pillars and Dimensions of Learning in the Framework Curriculum

Four pillars of learning (UNESCO, 1996) page 97	Dimensions of learning (UNESCO, 2019)
Learning to know by combining a sufficiently broad general knowledge with the opportunity to study a small number of topics in depth. This also means learning to learn in order to take advantage of the opportunities that education offers throughout life.	Cognitive: Acquisition of knowledge, understanding and critical thinking in relation to global, regional, national and local issues, the interconnectedness and interdependence of different countries and population groups as well as social, economic and environmental aspects of sustainable development.
To learn in order to better develop one's own personality and to be able to act with ever greater independence, judgment and personal responsibility.	Social and emotional: the feeling of belonging to a common humanity, the sharing of values and responsibilities, empathy, solidarity and respect for differences and diversity as well as the feeling and acceptance of responsibility for the future.
Learning to live together and live with others by developing an understanding of other people and an appreciation of interdependence, carrying out joint projects and learning to deal with conflict.	
Learning to acquire not only a professional skill, but also, in a broader sense, the competence to deal with many situations and to work in teams.	Behavior: Effective and responsible action at local, national and global levels for a more peaceful and sustainable world.

In teaching practice, this competence orientation thus means a shift from teacher-centered approaches to student-centered approaches and a change in the relationship between teaching and learning on the one hand and school assessment and evaluation on the other (see table 4).

Competence is traditionally understood as a combination of knowledge, skills and attitudes to be applied in a specific context or situation (EU, 2018).

Understanding the Competencies of the European Framework Curriculum

Various concepts of competence are discussed for ESD (Lang-Wojtasik & Scheunpflug, 2005; Rieckmann, 2013). In the controversial discussion about the term competence (e.g. Bader & Müller, 2002; KMK, 2011; de Haan, 2008), the OECD definition can be identified as a common denominator: "A competence is more than just

knowledge and cognitive skills. It is about the ability to cope with demands by drawing on and using psychosocial resources (including cognitive skills, attitudes and behaviors) in a given context" (OECD, 2005, p. 6). This means a shift from input-oriented to outcome-oriented teaching and learning strategies (Albareda-Tiana et al., 2019; Gordon et al, 2009). From this, a provisional competency grid was derived in the framework curriculum, which distinguishes between four competencies.

Table 5

ESD competence model of the framework curriculum

Dimensions Competence	Knowledge	skills	attitude
Issue competence	About factual topics and content related to ESD	Working with methods and instruments	Reflective; curious; responsible
Social competence	Communication, teamwork	Solving conflicts Steering dialogues	Open-mindedness Empathy Solidarity
Self competence	Personality, emotion behavior	Designing own life- and career curriculum	Courage and heart authenticity
Design competence Action competence	About process designing structure building	Designing processes and products	Dealing with variety and difference; entrepreneurship

It is crucial that learners can intelligently make connections between the dimensions of a competence, integrate them and apply them interactively to respond to contextual demands and change their contexts. For effective skills development, all learning dimensions - cognitive, socio-emotional and behavioral - must be developed together to achieve synergistic and holistic effects on learning outcomes (see table 5). The assessment of competences is the biggest challenge in the competence-based framework curriculum. A competence is the learner's demonstrated ability to apply knowledge and skills in value-based activities, including different learning environments and real-life situations. To record progress in competence development, an assessment concept has been developed that enables the standardization and associated measurement of acquired competences (Klieme, 2004). Performance indicators must therefore be determined in order to enable students and teachers to monitor learning success. Following Klieme, the important skills or key qualifications can be formulated as the ability to think holistically, to affirm change and to act transformatively, as shown by the widely differing competence models (Redman &

Wiek, 2021; Bianchi, 2020; Brundiers et al., 2020; Scherak & Rieckmann, 2020; Vare et al., 2019; Wiek, Withycombe & Redman 2011; Sleurs, 2008).

Table 6
Assessable Key Qualifications Assigned to the Pillars of Competence

Domains of competences	Pillars of education	Key qualification
Inquiry competence	Learning to learn	Critical thinking Systems thinking Decision making (reasoning)
Social competence	Learning to live together	Communication Collaboration Democracy and justice
Personal competence	Learning to be	Self-regulation, reflexivity Value-orientation Responsibility
SD action competence	Learning to do	Creative thinking Complex problem solving Innovation (transformation)

Table 7
SOLO Taxonomy

SOLO levels					
Dimensions of learning	Elements of competence	Unistructural	Multistructural	Relational (systemic)	Extended (Abstract)
		Surface learning		Deep learning	
Cognitive	Knowledge and understanding	Disciplinary, procedural	Multi-disciplinary, procedural	Inter-disciplinary, epistemic	Transdisciplinary/ contextualized, epistemic
Behavioral	Performance	According to instruction/ example	Self-directed, planned	Purposeful, problem solving	Responsible, value oriented
Social and emotional	Attitude (as reflected in performance)	Accepted (given) attitude	Different attitudes, looking for arguments	Different attitudes, looking for inter-relationships	Authentic attitude, based on democratic/ humanistic values

The ESD framework curriculum (see table 6) developed in the ESD SuperVision 4.0 project recommends the SOLO taxonomy (Biggs & Collis, 1982) as the basis for the description of learning outcomes and the assessment of skills (see table 7). SOLO stands for Structure of Observed Learning Outcomes and describes the different levels of student performance. In the SOLO taxonomy, knowledge and understanding are described as an increase in the number and complexity of connections that learners make as they progress from lower to higher levels of skill development. The emphasis is on the depth and quality of understanding rather than the quantity of information. It

should be emphasized that the direction of increasing complexity is a basis for systems thinking. A similar logic is applied to the description of behaviors, i.e. the actions of the learners: starting from declarative knowledge and acting according to instructions/examples - to the planning and implementation of an innovative activity and reflection in the context of sustainable development/the SDGs.

“At the end, a successful adoption of competence-based curricula requires an integrated and systemic approach to curriculum, teaching, learning, and assessment. Reforms in any one of these aspects cannot bear desired levels of impact without commensurate reforms in other aspects.” (Mmantsetsa, Griffin & Gallagher, 2019, p. 41).

This turns the implementation of an ESD framework curriculum into a school development process in the sense of organizational development. As a result, this has far-reaching consequences for the design of a training concept for the implementation of ESD in educational institutions. Teacher training should therefore always be linked to a school development concept and the specialized didactics (Keil, Kuckuck, & Faßbender, 2020; Sala & Herrero Rámila, 2022).

The ESD Training Concept

In the Berlin Declaration (2022) on the occasion of the World Conference on ESD, the signatory states committed to “promote a whole-institution approach, recognizing that learners and schools are meaningfully engaged in sustainable development through democratic participation by making their institutions real laboratories for participation and citizenship, equity and gender equality, health, closeness to nature and respect for the environment, energy efficiency and sustainable consumption, where education is experimental, action-oriented, locally centered and culturally specific, enabling learners to learn for life and live what they have learned” (UNESCO, 2022b, 4).

The Whole School Approach (WSA): The WSA focuses on the needs of learners, staff and the wider community, not just within the curriculum but across the whole school and learning environment. It requires collective and collaborative action in and by a school community to improve student learning, behavior and well-being and the conditions that support this. ESC requires not only the reorientation of teaching content and methods, but also infrastructure management that is in line with sustainable development, as well as collaboration between the institution and stakeholders in the community. The aim is to establish a culture of sustainability throughout the school and thus expand the contribution of individual teachers, who are then not only involved in islands of good practice, but in a social space for sustainability in practice. The WSA includes the development of a school program or school culture with a focus on ESD as well as the revision of school curricula. The involvement of learners, staff and school management (management), parents and relevant actors in the region (stakeholders) are seen as central aspects of the WSA, because in this way relationships with the community and networking are cultivated and the school itself can be perceived holistically as an institution and act as a model for learners. Following Dewey, the school thus becomes a microcosm of society (Oelkers, 2011). The ESD change process is implemented systematically and practically at the individual school level with regard to an ESD framework curriculum. This means that head teachers, teachers and

educational specialists must be trained and qualified in three fields of action. The stakeholders must acquire, broaden and/or deepen their skills in the fields of ESD, school development (WSA) and curriculum development. The overarching aim of a qualification is to enable participants to professionally support holistic and sustainable school development processes in their own school as agents for sustainable development and as ESD advisors and to convey sustainable development topics and skills in teachers' core business, the classroom.

Modules of the training concept: The task of the ERASMUS + project was to develop a training concept that is geared towards the framework curriculum, takes local characteristics into account and can be carried out by various stakeholders. The training concept was to be suitable both for in-house training and as an external offer from teacher training institutions. Due to the required flexibility, the modularization of the training content was imperative. The ESD SuperVision 4.0-training concept is based on six modules, the content of which can be taught within half a day (3-6 hours). However, the content can also be developed in a more differentiated and extensive way in one- to two-day seminars, depending on the capacity and needs of the schools. The individual modules are so open in terms of content that they can be designed as modules for further training, continuing education, internal school training, but also as training modules as part of degree courses. The modules were tested with teachers from different schools in various European countries and evaluated both formatively and summatively. In the following section, the content of the modules is presented, as well as the objectives in relation to the acquisition of skills. Particularly good experiences were made with certain methods in each module we described on the website of the project.

Exemplary Implementation of the Framework Curriculum at a Model School

The comprehensive school “IGS Oyten” is supported by the municipality of Oyten and comprises grades from 5 to 13. For six years, the students remain together in their learning group in secondary level 1 and are supervised by a class teacher tandem. Pupils' academic performance is recorded in half-yearly “learning development reports” up to the eighth grade; they only receive school marks for the first time from the second half of the eighth grade; from grade 9 onwards, school marks and learning development reports are issued. As a secondary school with a tied all-day program, lessons in secondary level I begin at 8:05 a.m. after the open start and include an afternoon program from Monday to Thursday until 3:00 p.m. (Friday until 12:55 p.m.).

Topic-oriented lessons (TO): The content and objectives of ESD are primarily incorporated into so-called topic-oriented lessons, or TO for short. In this form of teaching, the prescribed competencies of the core curricula of the subjects “social studies”, “values and standards”, “work-economy-technology” and, in some cases, science, music, art and drama are combined in one subject. The focus of each TO teaching unit, which lasts between six and eight weeks, is on topics and issues relating to the students' everyday lives and the future, which are all related to the 17 Global Goals. Depending on the year group, between four and six 75-minute TO lesson blocks are included in a class timetable. Each TO teaching unit is mainly divided into a basic phase and a project phase. In the basic phase, which lasts around three weeks, students learn the content and methodological basics of each topic using guiding questions so

that they can work on new questions as independently as possible in the subsequent project phase. Each TO lesson ends with a presentation to parents and guardians, which takes place in the late afternoon. On Fridays in the 2nd block, the so-called tandem discussions take place. In one-to-one discussions, the students reflect on their work and learning with their class tandem tutor based on the learning diary and agree on goals for the following period.

Other forms of teaching in the model timetable: The subjects German, English, mathematics and the second foreign languages French, Spanish and Latin are taught in the so-called learning office (Lernbüro).

Whole school approach and local engagement: In order to be able to address ESD in a way that is relevant to pupils, it must be implemented in a variety of projects and contexts. For this reason, there are all-day profiles at IGS Oyten, e.g. the 'Green Future' profile. In years 5 to 7, there are the inter-year special interest courses 'School Garden' and 'IT Freaks'. In these specialization courses, students learn the basics of content and methodology and can pursue their own interests and develop new ones. In years 9 and 10, all students then 'work' in one of the many departments of the sustainable student cooperative GenIO. In these departments, they can then expand and deepen their basic knowledge, which can also be important for career guidance. In the 'Green Future' profile, this can take place in the 'School Garden', 'School Forest' or 'Make_IT' departments.

Figure 2

Model Timetable (IGS Oyten, 2022, n.d.)

Time block	Time	Monday	Tuesday	Wednesday	Thursday	Friday
	07:45 – 08:05	Open beginning				
I	08:05 – 09:20	Learning office (LO) (languages/ math)	LO	LO	LO	LO
	09:20 – 09:40	Break				
II	09:40 – 10:55	LO	Inclination courses	TO Music/Art	TO	Work and practice / Tutorials
	10:55 – 11:15	Break				
III	11:15 – 12:30	TO (topic oriented lessons)	TO	TO	TO	Classroom council
	12:30 – 13:45	Lunch				Presentation
		Break/Leisure time				
IV	13:45 – 15:00	Sciences	TO	Work and practise	Physical education	

IGS Oyten is also locally and regionally active in numerous school and extracurricular networks. The long-term goal is to network Oyten's local educational institutions in an educational landscape. However, there are also contacts with

European partner schools, so that numerous different local, regional and international extracurricular learning locations are available. Education for sustainable development (ESD) is a primary school development goal.

Evaluation Results of the Accompanying Research

The following section focuses on the summative evaluation of the entire project, i.e. both the assessment of the implementation of the framework curriculum and the impact of the training units. With regard to the school-wide implementation of an ESD curriculum, the participants were asked about five strategic dimensions:

- ESD implementation into the formal curriculum;
- Implementation of social dimension of sustainability;
- Implementation of ecological dimensions of sustainability;
- Implementation of economic dimensions of sustainability within your institution;
- Implementation of cultural and political dimensions of sustainability

Table 8

Summary of the Results of the Evaluation of the Implementation of the Framework Curriculum (n=109)

	Mean M	fair implementation (1-2) in %
ESD implementation into the formal curriculum		
There is a co-ordination of ESD as a cross-curricular theme.	2.72	34,9
Teachers have competencies to introduce issues of sustainable development into their subjects.	2.55	42,2
There is a written policy that states the aims and objectives of ESD in our school.	2.53	39,5
The school can offer teaching materials on issues of sustainable development for all grades.	2.44	54,1
Teachers regularly evaluate the effectiveness of teaching/learning activities or topics about sustainable development.	2.27	54,1

In summary, the table 8 shows that there are moderate efforts in the school to integrate ESD into the curriculum, with the availability of teaching materials in need of improvement. There is also room for improvement in the coordination and skills development of teachers and in the formal setting of ESD objectives. In fact, half of those surveyed were skeptical about the extent to which it is possible to implement a WSA in their school. The interviews revealed that the bureaucratic and formal requirements for schools are so diverse that schools cannot be flexible enough to change lessons and everyday school life. Teachers also lack the experience of practical support through

material. At the end of the project, it can be seen that only around a third of respondents rated the coordinated implementation of ESD in the school program or formal curricula as good or excellent. The Whole School Approach is therefore a medium-term project in terms of its objectives.

Table 9

Summary of the Results of the Evaluation of the Social Implementation of the Framework Curriculum (n=109)

	Mean M	fair implementation (1-2) in %
Implementation of social dimension of sustainability		
Teachers and staff are skilled in conflict resolution strategies as a support for positive student behavior	2.91	24,8
The prevailing vision of the school and the curriculum adequately deal with inclusion	2.89	23,9
The prevailing vision of the school and the curriculum adequately prepare students for life as citizens of a global community	2.71	33,0
Students are given opportunities and equipped with skills to participate constructively in helping to solve local community problems	2.61	36,7
The vision of the school and the curriculum are sensitive to issues of (social) entrepreneurship	2.56	38,5

The data (see table 9) indicates that while there are efforts to implement the social dimension of sustainability, areas such as inclusion, preparation for global citizenship, and conflict resolution need more attention. There is moderate implementation in providing opportunities for community problem-solving and sensitivity to social entrepreneurship.

The results on the implementation of ESD with regard to social strategies show that two thirds of teachers assume that the strategies are appropriate and fit in with their own school ethos. This clearly shows that ESD is not entirely new to schools and that they therefore see ESD as compatible with their existing work, which is a good prerequisite for a whole-school implementation strategy.

Overall, the interviewees consider the teaching work at school to make a good ecological contribution (table 10). The data suggests that while there is a moderate implementation of ecological sustainability practices, there are notable strengths in providing an aesthetically pleasing environment. Although the respondents assess the incorporation of environmental issues into the curriculum as good they only use little efforts in minimizing harm through resource use and enhancing energy efficiency practices.

Table 10

Summary of the Results of the Evaluation of the Ecological Implementation of the Framework Curriculum (n=109)

	Mean M	fair implementation (1-2) in %
Implementation of ecological dimensions of sustainability		
School buildings and surroundings provide an aesthetically pleasing environment in which to live and learn	3.21	24,8
The school actively promotes attitudes of care and responsibilities for nature	3.11	11,9
The school purchases and uses resources with a view to minimize harm to the planet	3.06	47,8
The school uses recycled materials whenever possible and has an active and comprehensive recycling policy	2.73	33,0
The vision of the school and the curriculum is sensitive to environmental issues	2.73	15,6
The school actively promotes and practices energy efficiency	2.51	33,9

Table 11

Summary of the Results of the Evaluation of the Economic Implementation of the Framework Curriculum (n=109)

	Mean M	fair implementation (1-2) in %
Implementation of economic dimensions of sustainability within your institution		
Students have opportunities to participate in decisions about how resources are allocated in the school	2.93	56,0
A culture of maintenance ensures that all school buildings and equipment are kept in good repair and maintained in a good condition	2.75	31,2
The school's fund-raising activities reflect ethical principles	2.67	33,0
A spirit of co-operation and sharing - not competition - is customised in the allocation of resources in the school	2.67	31,2
Students learn small business skills through opportunities to organize school and community's projects (for example in the frame of circular economy)	2.27	39,5

The economic situation of schools (table 11) is rated as good with regard to the implementation of ESD in terms of fund-raising and project financing. However, only half of those surveyed consider the involvement of pupils in the question of how school resources should be used to be good. There is a need for improvement in other areas, such as the culture of maintenance, ethical fund-raising activities, co-operation and sharing in resource allocation, and opportunities for students to learn small business skills. The fact that this is also reflected in the motivation and entrepreneurial spirit of students, at least according to the respondents, is perhaps not surprising, but nonetheless remarkable.

Table 12

Summary of the Results of the Evaluation of the Cultural/Political Implementation of the Framework Curriculum (n=109)

	Mean M	Fair implementation (1-2) in %
Implementation of cultural and political dimensions of sustainability		
The school plays an active role in building support for cultural diversity, both within the school and its wider community	3.23	19,3
The prevailing vision of the school and the curriculum adequately prepare students for life in a multicultural society	3.19	12,8
The school vision and teaching approaches foster self-esteem, mutual respect and human social relationships	3.16	8,3
The ethical principles that are at the basis of ESD are made explicit and clarified in the educational offer of the school	3.16	33,9
The school participates in local governance on issues related to sustainable development	2.68	41,3
The prevailing vision of the school demonstrates that people matter and that everyone has a contribution to make to sustainable development	2.51	12,8

The data (table 12) shows that the school performs relatively well in supporting cultural diversity, preparing students for multicultural life, and fostering mutual respect and self-esteem. The school culture of the participating schools is described by the respondents as inclusive and multicultural. Although almost all respondents (92%) believe that their school plays an active role in the extracurricular community and, conversely, that the extracurricular partners are considered to be very important, the teachers are more reserved when it comes to local sustainability policy. This shows that 41% of respondents see the school as having little involvement in their own region. However, there is room for improvement in participating in local governance on sustainability issues and making explicit the importance of everyone's contribution to sustainable development.

Table 13*Summary of the Results of the Evaluation of the Training Modules Content*

	Mean M	fair implementation (1-2) in %
Evaluation of the training concept with regard to the content of the training		
The training course develops an understanding of the concept and practice of ESD through the identified content areas	3.18	10,0
The training course is relevant according to current policy frameworks	3.13	16,7
The training course gives opportunities to develop competences for institutional leadership and commitment to ESD integration	3.08	20,0
The training course (content and method) is relevant to my local context	3.05	18,3
The proposed teaching and learning approaches are appropriate for the level and experience of the learners	3.00	15,0
There are processes in act to ensure that the training structure and content are flexible in relation to adjust to the dynamic context	2.98	18,3
Overall, the training experience is sufficient to develop competencies to foster ESD as mainstream in the curriculum and in my institution	2.92	25,0
Evaluation of the concept with regard to the implementation of ESD in schools		
The training experience allows us to familiarize with the requirements of a whole-institution-approach	3.10	13,6
The training experience supports competence development to address the needs of change process concerning the implementation of ESD in curricula of secondary schools	3.05	16,9
The training experience supports competence development to deal with a whole institution process, change management, networking, and campaigning	3.03	18,6
The training experience supports competence development in managing participatory methods	3.00	22,3

The training experience offers appropriate process-related tools to deal with and to coach a whole-institution-approach	2.86	32,2
The training experience supports competence development to prepare solid didactical material	2.86	28,8

Even if, due to the limitations of the study design, it is difficult to show connections between the school development processes and the further training, there is some data worth reporting which, also against the background of the interviews, show that further training is only helpful if support and coaching is offered between the further training units.

The support of the school development process through the training modules described was seen as relevant and helpful by 85% of those surveyed. A slightly different picture emerges with regard to the implementation of the WSA. Here, fewer, but still two-thirds of those surveyed felt well supported by the training. From the interviews, there are two main reasons for this. Firstly, the training courses were offered at the end of the project. At this point in time, however, many steps had already been taken in the school to develop a school's own ESD curriculum. Secondly, further training alone is not considered sufficient, but also on-site support and advice at the school.

A frequent statement from the interviews is that there were new, inspiring, thought-provoking and practical things for the participants in each module that motivated them to drive forward school development at their own school as part of the project. In this respect, the training and the way in which it was offered brought movement into the school.

Although the training modules met the needs of the participating schools, it also raised other needs. These included:

- Concepts and implementation possibilities of interdisciplinary activities that can change the traditional curriculum.
- Creating learning environments in which students deal with real-life problems.
- Better use of targeted teaching methods and techniques suitable for the implementation of effective ESD activities and the assessment of learning outcomes
- Promote the development of students' awareness and sense of responsibility.
- Facilitate access to and participation in opportunities already available and offered by the school.
- Promoting cooperation between educational institutions and local administrative bodies
- Promoting stakeholder engagement in integrated training measures on sustainability topics
- Promote dialog with local governments to develop coherent and integrated practices between educational institutions and communities
- Develop a comprehensive environmental approach to the integration of care/efficiency of school facilities and the environmental impact, resource use and energy issues.

- Improving the use of economic resources for the development of sustainable practices (e.g. recycling collection), but also for the energy efficiency of school facilities
- Promote the development of students' awareness of the economic management and decision-making processes of the educational institution.
- Creating paths to micro-entrepreneurship.
- Promoting knowledge of specific topics such as the circular economy or the possibility of launching fundraising activities.
- Promoting the development of pedagogical skills
- Improve the use of inclusive and differentiated teaching strategies and materials.
- Develop methods of vision development for embedding education for sustainable development in the quality criteria for schools and evaluation for improvement processes.

There was no pattern here, from which it can be concluded that if you want to offer training modules on ESD tailored to the respective participants, you should first ask about their specific needs. After all, no school or teacher starts from scratch in the field of ESD.

Conclusion

The summative evaluation of the project focuses on the overall assessment of the project and not just on the impact of the training units. The main findings of the evaluation show that around two thirds of those surveyed consider the school-wide implementation of ESD (Education for Sustainable Development) in the school program to be good or excellent. Conversely, this means that a third of the teachers involved have not been reached, which does not correspond to the claim of a Whole School Approach (WSA). This makes training measures that address internal school challenges all the more important. 85% of respondents found the training modules relevant and helpful, which shows that the structure of the training concept is appropriate.

Overall, the results show that ESD is already embedded in many schools and is seen as compatible with the work done so far. However, there are specific needs and areas for further improvement, such as interdisciplinary curricula and the integration of real-world problems into lessons. Training should be tailor-made and needs-based, as schools and teachers are already engaged in ESD at a certain level and are not starting from scratch.

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