Chapter 2

Learning to transform the world: key competencies in Education for Sustainable Development

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Introduction

Education for Sustainable Development (ESD) aims to develop competencies that enable and empower individuals to reflect on their own actions by taking into account their current and future social, cultural, economic and environmental impacts from both a local and a global perspective. It requires individuals to act in complex situations in a sustainable manner – to explore new ideas and approaches and participate in socio-political processes, with the objective of moving their societies progressively towards sustainable development. ESD, understood in this way aims to enable learners to take responsible actions that contribute towards creating sustainable societies now and in the future. It 'develops the skills, values and attitudes that enable citizens to lead healthy and fulfilled lives, make informed decisions, and respond to local and global challenges' (UNESCO, 2016: IV).

ESD should be understood as an integral part of quality education and lifelong learning. All educational institutions ranging from preschool to tertiary education and including both non-formal and informal education should consider it their responsibility to address sustainable development

and to foster the development of key cross-cutting competencies related to sustainability. The development of these competencies is an essential contribution to efforts to achieve the Sustainable Development Goals (SDGs). ESD equips individuals not only with the knowledge to understand the SDGs, but also with the competencies to engage as informed citizens in promoting the transformation to a more sustainable society (UNESCO, 2017).

ESD consists of holistic and transformational education that addresses learning content and outcomes, pedagogy and the learning environment. In addition to including and prioritizing content on climate change, poverty and sustainable consumption in the curriculum, ESD also creates interactive, learner-centred teaching and learning settings. In essence, ESD requires a shift from teaching to learning. This takes the form of an action-oriented transformative pedagogy, characterized by elements such as self-directed learning, participation and collaboration, problem-orientation, and inter and transdisciplinarity, as well as the linking of formal and informal learning. Such pedagogical approaches are essential for the development of competencies vital for promoting sustainable development.

This chapter presents ESD as a form of transformative and competence-based education. It describes the competencies that ESD should develop and the action-oriented transformative pedagogy needed to facilitate this process. It also discusses the needs of educators in developing competencies for ESD.

ESD as transformative and competence-based education

Societies across the globe are facing new challenges arising from the pace of technological progress and globalization. These include growing complexity and uncertainty, increasing individualization and social diversity, expanding economic and cultural uniformity, degrading ecosystem services upon which societies depend, and heightened vulnerability and exposure to natural and technological hazards. Additionally, these societies now have a vast and continuous stream of information at their disposal. The complexity of these challenges – including the variety of actors involved, the situation and the courses of action – does not allow for straightforward problem-solving processes and instead necessitates creative and self-organized action.

In order to contribute to sustainable development, individuals need to learn how to understand the complex world in which they live, and how to deal with uncertainties, trade-offs, risks and the high velocity of societal (global) change. They need to be able to collaborate, speak up and act for positive change within the world (UNESCO, 2015a). These people might be called 'sustainability citizens' (Wals, 2015; Wals and Lenglet, 2016).

Since the late 1990s, the discourse on how to educate such sustainability citizens has shifted from an input orientation, focusing on lists of essential educational content, to an outcome-based competence approach (Adomßent and Hoffmann, 2013; Wiek, Withycombe and Redman, 2011). Such outcomes include enabling people to engage effectively in this increasingly complex world and contribute to transforming its structures. The competence approach is based on establishing which approaches work best in the real world and then identifying how to foster the necessary learning.

As noted above, in the context of current global challenges, it is argued that ESD should enable individuals to reflect on their own actions by taking into account their current and future social and environmental effects – from a global perspective. This then enables them to intervene productively in shaping them in a more sustainable manner. A competence-based approach can help here to bridge the gap between knowledge and action (see Figure 1).

Instead of promoting certain behaviours and ways of thinking ('ESD 1'/'instrumental approach'), an emancipatory concept of ESD focuses, in particular, on 'building capacity to think critically about [and beyond] what experts say and to test sustainable development ideas' and 'exploring the contradictions inherent in sustainable living' ('ESD 2')[1] (Vare and Scott, 2007: 194; cf. Wals, 2015). Against this background, ESD aims to develop competencies that enable individuals to participate in socio-political processes and, hence, to move their societies towards sustainable development (Rieckmann, 2012; Wiek, Withycombe and Redman, 2011). Approaching ESD from a competence point of view allows the exploration of key areas essential to success in the area of sustainability.

1 Vare and Scott (2007) distinguish between ESD with an instrumental approach ('ESD 1') and ESD with an emancipatory approach ('ESD 2').

Accordingly, the Global Action Programme (GAP) on ESD states that:

> ESD allows every human being to acquire the knowledge, skills, values and attitudes that empower them to contribute to sustainable development and take informed decisions and responsible actions for environmental integrity, economic viability, and a just society for present and future generations. […] ESD promotes skills like critical thinking, understanding complex systems, imagining future scenarios, and making decisions in a participatory and collaborative way (UNESCO, 2014b: 33).

Development of sustainability competencies

The emancipatory ESD approach aims to identify key competencies needed for learners to become sustainability citizens. Accordingly, the GAP highlights learning outcomes that stimulate learning and promote core competencies, such as 'critical and systemic thinking, collaborative decision-making, and taking responsibility for present and future generations' (UNESCO, 2014b: 12).

An increasing number of researchers are examining the many interconnecting aspects of ESD and their associated competencies (e.g. de Haan, 2010; Glasser and Hirsh, 2016; Rieckmann, 2012; Wiek, Withycombe and Redman, 2011; Wiek et al., 2016). Between them, they outline key competencies essential for individuals to transform their own lifestyles and to contribute to societal transformation towards sustainability:

- **OECD's key competencies:** The OECD project 'Definition and Selection of Competencies' (DeSeCo) classifies key competencies into three categories: Using tools interactively (the ability to use language, symbols and texts interactively, the ability to use knowledge and information interactively, and the ability to use technology interactively); *Interacting in heterogeneous groups* (the ability to relate well to others, the ability to cooperate, and the ability to manage and resolve conflicts); and Acting autonomously (the ability to act within the big picture; the ability to form and conduct life plans and personal projects; and the ability to defend and assert rights, interests, limits and needs) (Rychen, 2003).

- **Gestaltungskompetenz (shaping competencies):** This framework consists of the following key competencies for shaping or transforming the future: gather knowledge in a spirit of openness to the world, integrating to align with the other imperatives - think and act in a forward-looking manner; acquire knowledge and act in an interdisciplinary manner; deal with incomplete and overly complex information; cooperate in decision-making processes; cope with individual decision-making dilemmas; participate in collective decision-making processes; motivate oneself as well as others to become active; reflect upon one's own principles and those of others; refer to the idea of equity in decision-making and planning actions; plan and act autonomously; and show empathy for, and solidarity with, the disadvantaged (de Haan, 2010).

- **Key competencies for sustainable development:** The following list of key competencies was compiled as part of a Delphi study by ESD experts from Chile, Ecuador, Germany, Mexico and the United Kingdom: systemic thinking and handling of complexity, anticipatory thinking, critical thinking, acting fairly and ecologically, cooperation in (heterogeneous) groups, participation, empathy and change of perspective, interdisciplinary work, communication and use of media, planning and realizing innovative projects, evaluation, and ambiguity and frustration tolerance.[2]

- **Sustainability competencies:** Wals (2015) distinguishes the following competence-based dimensions of sustainability: the dynamics and content of sustainability, the critical dimension of sustainability, the change and innovation dimension of sustainability, and the existential and normative dimension of sustainability.

- **Key competencies in sustainability:** Wiek et al. have recently updated their framework, which comprised five key competencies, adding a sixth (problem-solving competence) in 2016: systems thinking competence, anticipatory competence, normative competence, strategic competence, interpersonal competence and integrated problem-solving competence. Their work has played an important role in drawing together many of these concepts and lists, and in providing a structure for facilitating discussion about the

2 The competency for ambiguity and frustration tolerance relates to coping with conflicts, competing objectives and interests, contradictions and setbacks (Rieckmann, 2012).

competencies considered critical for sustainability (Wiek, Withycombe and Redman, 2011, Wiek et al., 2016).

- **Sustainability core competencies:** Glasser and Hirsh (2016) identified five additional key competencies: affinity for life, knowledge about the state of the planet, wise decision- making, modelling sustainable behaviour and transformative social change.

While these lists exhibit certain differences, they also coincide with a number of key sustainability competencies. There is general agreement within the international ESD discourse that the following key sustainability competencies are of particular importance for thinking and acting in favour of sustainable development:

- *Systems thinking competency:* the ability to recognize and understand relationships, to analyse complex systems, to perceive the ways in which systems are embedded within different domains and different scales, and to deal with uncertainty;
- *Anticipatory competency:* the ability to understand and evaluate multiple futures – possible, probable and desirable – and to create one's own visions for the future, to apply the precautionary principle, to assess the consequences of actions, and to deal with risks and changes;
- *Normative competency:* the ability to understand and reflect on the norms and values that underlie one's actions and to negotiate sustainability values, principles, goals and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions;
- *Strategic competency:* the ability to collectively develop and implement innovative actions that further sustainability at the local level and further afield;
- *Collaboration competency:* the ability to learn from others; understand and respect the needs, perspectives and actions of others (empathy); understand, relate to and be sensitive to others (empathic leadership), deal with conflicts in a group; and facilitate collaborative and participatory problem-solving;
- *Critical thinking competency:* the ability to question norms, practices and opinions; reflect on own one's values, perceptions and actions; and take a position in the sustainability discourse;

- *Self-awareness competency:* the ability to reflect on one's own role in the local community and (global) society, continually evaluate and further motivate one's actions, and deal with one's feelings and desires;
- *Integrated problem-solving competency:* the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solution that promote sustainable development – integrating the above-mentioned competencies.

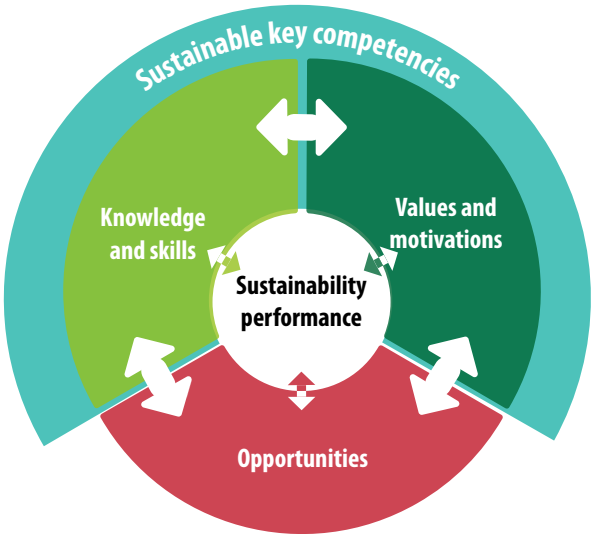
This list highlights competencies that are particularly essential for sustainability and which have not been the main focus of formal education. While each competency has its own qualities and areas of relevance, they are mutually interdependent. This is why the integrated problem-solving competency is of particular importance. In addition, basic competencies such as communication skills are crucial for dealing with sustainable development. Furthermore, these key sustainability competencies have to be developed in conjunction with basic competencies (Wiek, Withycombe and Redman, 2011).

However, while competencies describe the capacity or disposition to act to address complex challenges, they do not necessarily imply that an individual will act in a certain way in a specific situation. Hence, to transform capacities into real sustainable actions, individuals need corresponding values and motivational drivers.

Furthermore, sustainability performance is related to an individual's environment, understood as opportunities to perform that are beyond the individual's control. From this perspective, opportunities are environmental and contextual mechanisms that enable action. In other words, they are conditions that provide the necessary support and avenues for sustainability-driven action. Leaning on the capability approach, Nussbaum (2000) emphasizes the crucial importance of governance institutions in providing opportunity structures that give individuals the capability to act. In other words, 'capabilities could be understood as the set of real opportunities […] to be what they have reason to value' (Lozano et al., 2012: 4).

According to this approach, sustainability performance depends on the interplay of knowledge and skills, values and motivational drivers, and opportunities. The interrelation of these dimensions influences personal behaviour (Figure 1).

Figure 1: Key competencies and performance of sustainability citizens



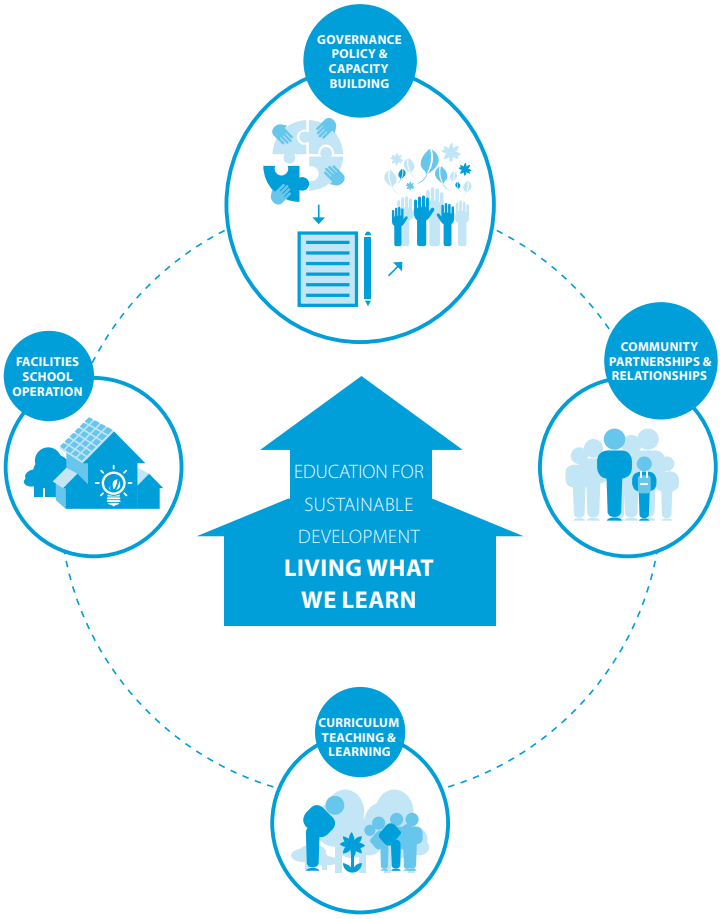
Source: Author

Main implications of ESD for the practice of education and pedagogy

Whole-institution approach

ESD is not just a matter of teaching sustainable development and adding new content to courses and trainings. Schools and universities, for instance, should see themselves as experiential places of learning for sustainable development, and should therefore orient all their processes towards principles of sustainability. For ESD to be more effective, the educational institution as a whole has to be transformed. Such a whole-institution approach aims to mainstream sustainability into all aspects of the educational institution. It involves rethinking the curriculum, campus operations, organizational culture, student participation, leadership and management, community relationships and research (UNESCO, 2014a). In this way, the institution itself functions as a role model for the learners. Sustainable learning environments, such as eco-schools or green campuses, allow educators and learners to integrate sustainability principles into their daily practices and facilitate capacity-building and competence development, and value education in a comprehensive manner.

Figure 2: The whole-institution approach



Source: UNESCO (2014a: 89).

Given the importance of transforming the whole educational institution, GAP Priority Action Area 2 ('Transforming learning and training environments: Integrate sustainability principles into education and training settings') calls for 'promoting whole-institution approaches to ESD in schools and all other learning and training settings' (UNESCO 2014b: 18). Thus, whole-institution approaches should be promoted at all levels and in all settings. Accordingly, schools and other educational institutions, and public and private sector organizations, are encouraged to implement sustainability plans or strategies.

Existing experiences with whole-institution approaches in the areas of higher education and secondary schools need to be scaled up and expanded to other levels and types of education, such as early childhood education, technical and vocational education and training (TVET), and non-formal education for youth and adults. Key elements for a whole-institution approach are summarized in Box 1.

Box 1: Key elements for whole-institution approaches

1. An institution-wide process is organized in a manner that enables all stakeholders – leadership, teachers, learners, administration – to jointly develop a vision and plan to implement ESD in the whole institution.
2. Technical and, where possible and appropriate, financial support is provided to the institution to support its reorientation. This can include the provision of relevant good practice examples, training for leadership and administration, the development of guidelines, as well as associated research.
3. Existing relevant inter-institutional networks are mobilized and enhanced in order to facilitate mutual support such as peer-to-peer learning on a whole-institution approach, and to increase the visibility of the approach to promote it as a model for adaptation.

Source: UNESCO (2014b).

While all elements of the whole-institution approach are important, interactive, integrative and critical forms of learning are at the core of delivering ESD in the classroom and other learning settings, making this approach an action-oriented transformative pedagogy.

Action-oriented transformative pedagogy

ESD is about developing sustainability competencies and, thus, empowering and motivating learners to become active and critical sustainability citizens able to participate in shaping a sustainable future. The pedagogical approaches needed to achieve this end should be learner-centred, action-oriented and transformative (see Box 2).

Box 2: Key pedagogical approaches in ESD

A learner-centred approach

Learner-centred pedagogy sees students as autonomous learners and emphasizes the active development of knowledge rather than its mere transfer and/or passive learning experiences. The learners' prior knowledge as well as their experiences in the social context are the starting points for stimulating learning processes in which the learners construct their own knowledge base. Learner-centred approaches require learners to reflect on their own knowledge and learning processes in order to manage and monitor them. Educators should stimulate and support those reflections. Learner-centred approaches change the role of an educator from that of an expert who transfers structured knowledge to that of a facilitator of learning processes (Barth, 2015).

Action-oriented learning

In action-oriented learning, learners engage in action and reflect on their experiences in relation to the intended learning process and personal development. The experience might come from a project (e.g. in-service learning), an internship, facilitation of a workshop, implementation of a campaign and so on. Action-learning draws on Kolb's learning cycle of experimental learning, which has the following stages: (i) having a concrete experience, (ii) observation and reflection, (iii) formation of abstract concepts for generalization and (iv) application in new situations (Kolb, 1984). Action-learning increases knowledge acquisition, competency development and values clarification by linking rather abstract concepts to personal experience and the learners' life. The role of the educator is to create a learning environment that prompts learners' experiences and reflexive thought processes.

Transformative learning

Transformative learning can be defined primarily by its aims and principles, not by a concrete teaching or learning strategy. It aims to empower learners to question and change their ways of seeing and thinking about the world, in order to further develop their understanding of it (Mezirow, 2000; Slavich and Zimbardo, 2012). The educator acts as a facilitator who empowers and challenges learners to change their worldviews. The related concept of transgressive learning (Lotz-Sisitka et al., 2015) goes one step further – it states that learning in ESD has to overcome the status quo and prepare the learner for disruptive thinking and the co-creation of new knowledge.

While such pedagogical approaches describe the general character or guiding principles for designing learning processes in ESD, specific methods in line with these principles are needed to facilitate the learning process. ESD favours methods that foster sustainability competencies through active learning. Some methods can be particularly recommended for ESD (see Box 3).

Box 3: Key methods in ESD

- Collaborative real-world projects such as a service-learning project and campaigns for different sustainability topics;
- Vision-building exercises such as future workshops, scenario analyses, utopian/dystopian story-telling, science-fiction thinking, and fore and back-casting;
- Analysis of complex systems including community-based research projects, case studies, stakeholder analysis, actor analysis, modelling and systems games;
- Critical and reflective thinking including through fish-bowl discussions and reflective journals.

These participatory teaching and learning methods empower learners to take action to promote sustainable development. When teaching and learning methods for a specific setting are chosen, they have to match the needs of the learner group (e.g. based on age, prior knowledge, interests and abilities), the context in which the learning takes place (e.g. space in the curriculum, pedagogical climate and cultural traditions), and the resources and support available (e.g. teacher competencies, teaching materials, technology and money).

In order to create diverse and cross-boundary learning settings and draw holistic, comprehensive pictures of global sustainability challenges (including the SDGs), educational institutions and educators should foster partnerships at the local, national and international level. While acknowledging that adequate responses to sustainability challenges cannot be limited to single perspectives, disciplines or ways of knowing, it is important that learning within partnerships (involving a range of societal actors, such as businesses, NGOs, public institutions and/or policy-makers) becomes a source of creativity and innovation. Such dialogues or projects enable students to learn about real-world challenges and from the partners' expertise and experiences. At the same time, they can be empowering for partners and can increase their capacity as critical agents of change. In addition, partnerships between learners from around the world foster the exchange of different perspectives and knowledge concerning similar topics. For example, virtual courses can provide an environment to initiate global dialogues and foster mutual respect and understanding.

Action-oriented transformative pedagogies also contribute to achieving the aims of GAP Priority Action Area 4 ('Empowering and mobilizing youth'), which calls for 'more quality e-learning opportunities for youth; youth participating in and contributing to ESD advocacy, policy development and implementation at local, national and international levels; and more youth-led ESD activities' (UNESCO, 2014b: 23).

Need for assessment of ESD learning outcomes

To date, little is known about the quality of ESD programmes, the extent of their implementation and their effectiveness in generating the desired changes in learning attainments (knowledge, competencies, attitudes, values and behaviour). Assessing both the outcomes of ESD and efforts that seek to reorient education systems is a challenge to be addressed (UNESCO, 2014a). ESD programmes and initiatives should be assessed at multiple levels, in particular: large-scale assessments for learning outcomes, assessment of learning outcomes at the individual level, national assessments more aligned with national educational priorities, contextualized school and institutional assessments to improve implementation and delivery, the development of formative assessment practices to empower teachers to gauge specific pedagogical practices in classrooms, and personal self-assessment of individual progress. ESD elements are already included in several large-scale assessments (see Box 4).

Box 4: Examples of large-scale assessments that include ESD elements

Assessing exposure to sustainable development

'International assessments of learning attainments are beginning to incorporate aspects of ESD. The PISA 2006 assessment focused on science literacy and, among other things, compiled information about the inclusion of environmental science topics in the school curriculum (OECD, 2009). PISA found that 98 per cent of students in OECD countries attend schools in which environmental topics (e.g. pollution, environmental degradation, relationships between organisms, biodiversity and conservation of resources) are taught. While the curricular locations of environmental science topics may differ from one system to the next, most (lower) secondary students in OECD countries have been exposed to, and are required to master, a set of key environmental themes. Among students in non-OECD countries, the opportunity to learn about the environment varies to a much greater extent.'

Assessing sustainability-related choices and actions

'Even more challenging to determine is whether knowledge and learning attainments are leading to sustainability-related choices and actions. There are some promising initiatives in this area: for example, the International Civics and Citizenship Study (ICCS) across thirty-eight countries in 2008 and 2009, sponsored by the International Association for the Evaluation of Educational Achievement, has found a positive correlation between citizenship education with engagement of students in active citizenship (Schulz et al., 2010).'

Source: UNESCO (2014a: 98).

In 2013, the PISA Governing Board decided to undertake an assessment of 'global competence' (OECD, 2016) as part of the 2018 PISA assessment. Global competence is defined by the OECD as

> the capacity to analyse global and intercultural issues critically and from multiple perspectives, to understand how differences affect perceptions, judgements, and ideas of self and others, and to engage in open, appropriate and effective interactions with others from different backgrounds on the basis of a shared respect for human dignity (OECD, 2016: 4).

The cognitive test, developed in consultation with OECD member countries and expert advisors, will assess young people's knowledge and understanding of global issues, intercultural knowledge and understanding, and analytical and critical thinking skills. Additionally, the student questionnaire will use self-reported data to analyse skills such as the ability to interact respectfully, appropriately and effectively, and demonstrate empathy and flexibility, as well as attitudes such as openness towards people from other cultures, respect for cultural otherness, global-mindedness and responsibility (OECD, 2016: 6). The test will 'offer the first, comprehensive overview of education systems' success

in equipping young people to support the development of peaceful, diverse communities' (OECD, 2016: 3). At a meeting of G7 education ministers held in Kurashiki, Japan, on 14 May 2016, ministers noted that the assessment may well provide a metric to measure progress in this area.

PISA and other large-scale assessments, such as the International Civic and Citizenship Education Study (ICCS) 2016,[3] can make important contributions to better understanding the development of ESD learning outcomes and to increasing the visibility of ESD's contributions to quality education. They can also provide the data needed to monitor thematic indicators 26 'Percentage of students by age group (or education level) showing adequate understanding of issues relating to global citizenship and sustainability' and 27 'Percentage of 15-year-old students showing proficiency in knowledge of environmental science and geoscience' of Target 4.7 of the SDGs (UNESCO, 2015b).

Assessment and evaluation can serve several purposes in ESD (see Box 5).

Box 5: Different purposes of assessment in ESD at the individual level

- Gather information and record learners' progress and achievement toward intended learning outcomes;
- Communicate progress to learners, identify strengths and areas for growth, and use this information to set learning goals;
- Provide feedback about the success of teaching and learning processes to help plan, implement and improve these processes;
- In formal education, guide decisions about learners' grading and academic and occupational choices.

There are many ways to assess learning outcomes. The approach taken will depend on the context (e.g. the characteristics of the education system) and on how ESD is delivered (e.g in formal education ESD is delivered across the curriculum or within a specific subject or other modality). Methods of assessment will need to be aligned with learning objectives and teaching and learning practices. Given the variety of learning objectives and competencies, assessment of ESD learning will most likely involve a range of methods.

It is crucial that the methods used to assess ESD extend beyond verifying knowledge of facts to also assess learners' competencies. Assessing

3 See http://iccs.iea.nl.

competence development in ESD remains a major challenge, as much remains to be done to operationalize and model sustainability competencies. Another challenge lies in assessing changes in competencies and other learning outcomes over time. Longitudinal studies are promising in this regard, and also appear useful for exploring the impact of whole institutional approaches to ESD.

As the transformative applications of ESD are wide-ranging, educators need to consider the broader purposes of assessment. They need to move beyond the exclusive use of *assessment of learning to forms of assessment for learning and assessment as learning*. Using a mix of traditional assessment methods and more reflective and performance-based approaches, such as self-assessment and peer assessment, enables educators to capture learners' insights regarding their personal transformation, their growing capacity for critical inquiry, and engagement and civic agency, among others. Feedback from educators, peer feedback and self-evaluation (e.g. through the use of reflective journals or portfolios) empower learners to monitor their own learning processes and identify possible areas for improvement.

In addition to assessing learning outcomes, it is important to undertake ongoing monitoring and assessment of the quality of ESD programmes. This can focus on programmatic aspects (e.g. learning expectations, resources, teaching competencies and the learning environment), processes (e.g. teaching practices, learning resources, learners' engagement), outcomes (e.g. knowledge, competencies, values and attitudes, and transformative effect) and contextual considerations.

Efforts to carry out an effective assessment of ESD programmes should be integrated where possible into existing assessment practices. Those involved must pay careful attention to a range of factors. Assessment purposes and indicators (e.g. status, facilitative and results) need to be clearly defined, the nature of the teaching/learning population and context need to be considered, and the kind of information that constitutes acceptable evidence and methods of collecting data need to be determined.

The results of a programme assessment can be used for various purposes (see Box 6).

Box 6: Different purposes of programme assessment

- Identifying programmatic limitations;
- Targeting specific areas for improvement;
- Reporting local, national and international trends and outcomes;
- Evaluating programme effectiveness;
- Promoting accountability and transparency.

Monitoring and evaluation must be improved to secure the evidence for continued and expanded investment in ESD, and for reflexive engagement with ESD as an emerging educational re-orientation process. Therefore, it is crucial to develop indicator frameworks that establish standards for ESD learning outcomes.

Key competencies for ESD educators

Educators are powerful change agents with the ability to deliver the educational response needed in the context of sustainable development. Their knowledge and competencies are crucial for restructuring educational processes and educational institutions towards sustainability.

Teacher education must meet this challenge by reorienting itself towards ESD, as demanded by international declarations such as the Strategy for Education for Sustainable Development (UNECE, 2005) and the Bonn Declaration (UNESCO, 2009), as well as various educational policy papers published at the national level. Monitoring and evaluation of the Decade of Education for Sustainable Development (DESD) has highlighted many good examples of how to integrate ESD into teacher education. It has also identified support for teachers as a key condition for the successful adoption and implementation of ESD (UNESCO, 2014a).

However, efforts to prepare teachers to implement ESD have not advanced sufficiently. More work is needed to reorient teacher education to approach ESD both in terms of content and teaching and learning methods. For this reason, Priority Action Area 3 of the GAP aims to build the capacities of educators. One proposed action is to integrate ESD into pre-service and in-service teacher education programmes (UNESCO, 2014b).

For teachers to be adequately prepared to facilitate ESD, they must develop key sustainability competencies, including knowledge, skills, attitudes, values, motivation and commitment. However, in addition to general sustainability

competencies, they also need ESD competencies, which can be described as a teacher's capacity to help people develop sustainability competencies through a range of innovative teaching and learning practices (see Box 7).

Box 7: Learning objectives for teachers to promote ESD

- Know about sustainable development and the related topics and challenges;
- Understand the discourse on, and the practice of ESD in the local, national and global context;
- Develop an integrative view of the key issues and challenges taking into account social, ecological, economic and cultural dimensions from the perspective of the principles and values of sustainable development;
- Develop disciplinary, interdisciplinary and transdisciplinary[5] perspectives on issues of global change and their local manifestations;
- Reflect on the challenges facing promotion of the concept of sustainable development and the importance of their field of expertise for facilitating sustainable development and their own role in this process;
- Reflect on the dynamics of formal, non-formal and informal learning for sustainable development, and apply this knowledge in their own professional work;
- Understand the ways in which cultural diversity, gender equality, social justice, environmental protection and personal development are integral elements of ESD and how they can be made a part of educational processes;
- Practise an action-oriented transformative pedagogy that engages learners in participative, systemic, creative and innovative thinking and acting processes in the context of local communities and learners' daily lives;
- Act as a change agent within a process of organizational learning to advance the school towards sustainable development;
- Identify local learning opportunities related to sustainable development and build cooperative relationships;
- Evaluate and assess learners' development of cross-cutting sustainability competencies and specific sustainability-related learning outcomes.

Source: UNESCO (2017).

For more information, please visit: https://www.leuphana.de/fileadmin/user_upload/portale/netzwerk-lena/Memorandum_LeNa_English_Stand_August_15.pdf

These objectives are described in more detail in a number of competency-based models for educators in the field of ESD. Key examples include the

4 Interdisciplinarity refers to cooperation among different scientific disciplines and the 'integration of different disciplinary perspectives, theories and methods.' Transdisciplinarity refers to 'cooperation with experts in possession of practical experience from outside the academic world' (Godemann, 2006: 52).

CSCT model (Sleurs, 2008), the UNECE model (UNECE, 2012), the KOM-BiNE model (Rauch and Steiner, 2013) and the approach devised by Bertschy, Künzli and Lehmann (2013). Teacher education programmes should be further developed to meet these standards.

The UNECE model (2012) concerns all educators in all education and learning settings and is divided into four areas: (i) Learning to know (the educator understands...), (ii) Learning to do (the educator is able to…), (iii) Learning to live together (the educator works with others in ways that...) and (iv) Learning to be (the educator is someone who...). The CSCT, UNECE and KOM-BiNE models are based on the relationship between teachers and society; their values, attitudes and behaviour with regard to sustainability; and their participation in the sustainable development of society. In comparison, the approach taken by Bertschy, Künzli and Lehmann (2013) focuses on the professional context, in particular the fundamental knowledge, competencies and skills teachers must possess in order to deliver ESD in the classroom. However, this approach raises the question of whether teachers who do not, to some extent, align their own values and behaviour with the idea of sustainable development, can work with students on sustainability issues.

To facilitate the development of ESD competencies in teacher education, changes need to be made to the content and structure of pre-service and in-service teacher education. ESD should provide the fundamental orientation for teacher education programmes. Subject disciplines, subject didactics, educational sciences and practice-oriented studies should include methodology principles and subject knowledge from ESD (see Box 8).

Box 8: Possible modules of a teacher education curriculum with ESD as a key element

- Basic concepts of sustainable development from a local, national and international perspective;
- ESD concepts from a local, national and international perspective;
- Disciplinary, interdisciplinary and transdisciplinary views of key examples of sustainability challenges;
- Project-oriented work on specific problems of local, national and global importance in cooperation with educational institutions and other (local) partners;
- Research-based analysis of ESD processes in different learning settings (e.g. schools, colleges or non-formal educational institutions);
- Practical experiences with ESD approaches and associated critical reflection.

Learning on the basis of real societal challenges in local contexts requires cooperation with external partners. Modules should thus enable access to external partners (e.g. communities, non-formal educational institutions and ESD networks) and include possibilities for project-oriented collaboration.

Additionally, ESD requires internationalization as an element of teacher education, in particular by making international debates about ESD and discussions about cultural diversity integral components of modules. This means that students should be given the opportunity to study abroad, in order to facilitate practical experiences.

To better integrate ESD into teacher education, development of the content and organization of teacher education programmes should involve the participation of key stakeholders such as students, teachers, local NGOs and ESD experts. To facilitate innovation, it is crucial that educational institutions have the necessary structural conditions as well as the freedom to engage in organizational learning processes.

As pre-service training still does not include a focus on ESD, many teachers need to have access to dedicated in-service training on the issue. This would open up opportunities to develop the necessary knowledge and competencies to participate in the sustainable development process. Furthermore, professional development is a prerequisite for reorienting educational processes and educational institutions. Accordingly, it is crucial that professional development for ESD is made available to more than just one teacher from the same institution and recognized by the educational systems with regard to applications, promotions and so on. National and Regional Centres of Expertise for ESD could also develop opportunities for professional development and advisory services, making use of the potential of government and non-governmental organizations, as well as universities and other institutions of higher education.

Conclusion

ESD can help to facilitate sustainable development by developing the cross-cutting sustainability competencies needed to deal with a wide range of sustainability challenges. To empower people worldwide to take action in favour of sustainable development, all educational institutions should undertake to deal intensively with sustainable development issues and foster the development of sustainability competencies. Therefore, it is crucial not only to include sustainability-related content in the curricula, but also to employ an action-oriented transformative pedagogy. To put this pedagogy into practice, educators are needed who not only know about ESD, but who also have developed teaching competencies related to ESD in their own education and training.

Chapter 3

Key themes in Education for Sustainable Development

Marco Rieckmann

Introduction

While the acquisition of sustainability competencies is at the core of Education for Sustainable Development (ESD), the choice of topics and content used for developing these competencies is not arbitrary. Key themes of ESD are crucial for sustainable development processes at the local and/or global level, and their selection has implications for the future. Differentiated knowledge about topics from different areas should also be available to learners to allow them to analyse this information from alternative perspectives. The potential for action by learners should also be implicit in the topics.

Fields of action essential for facilitating sustainable development have been identified by a range of scientific studies, societal experiences and related discourse. These fields of action are thematic priorities for ESD. The **Sustainable Development Goals (SDGs)** identify 17 such fields of action (see Figure 1).