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ESD Curriculum Framework for School Development in Europe

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Abstract

Developing students' and teachers' competences is seen as a prerequisite for responsible behaviour that promotes sustainable development. The framework draws on relevant UNESCO and European Commission documents to provide a strategic context and conceptual background and to set out the learning outcomes to be developed in schools. The desired learning outcomes are in the cognitive, social, emotional and behavioural domains, all of which are important for a holistic education. The transdisciplinary themes associated with the SDGs provide a suitable ground for developing competences - both in how they are understood in different school subjects and in how they pursue the goal of promoting authentic, value-based behaviour. To assess the development of such competences, the Structure of Observed Learning Outcomes (SOLO) taxonomy can be used, which describes progressively increasing levels of learning outcomes achieved by students, emphasising increasing complexity. The Framework presented here is intended to be a flexible guide that can transform the curriculum towards competence-based and transformative learning according to the country's context.

Keywords

Education for sustainable development; curriculum; learning objectives; sustainability competences; learning domains; SOLO taxonomy

Abstrakt

Rozvoj kompetencí žáků a pedagogů je považován za nezbytný předpoklad odpovědného jednání podporujícího udržitelný rozvoj. V tomto Rámci se vychází z příslušných dokumentů UNESCO a Evropské komise, jejichž cílem je poskytnout strategický kontext a koncepční zázemí, a dále stanovit výsledky učení, které je třeba ve škole rozvíjet. Požadované výsledky učení spadají do kognitivní, sociální a emocionální oblasti a týkají se i chování; všechny tyto aspekty jsou důležité pro holistické vzdělávání. Transdisciplinární témata spojená s Cíli udržitelného rozvoje poskytují vhodnou půdu pro rozvoj kompetencí – tím, jak jsou uchopeny v různých školních předmětech na jedné straně, a jak sledují cíl podpořit autentické, hodnotově podložené jednání na straně druhé. K hodnocení rozvoje takto založených kompetencí lze použít taxonomii SOLO (Structure of Observed Learning Outcomes), která popisuje postupně stoupající úrovně výsledků učení, jichž žáci/studenti dosahují, přičemž důraz je kladen na rostoucí komplexnost. Předložený Rámec by měl být flexibilním vodítkem, které lze využít k proměně kurikula směrem ke kompetenčně pojatému a transformativnímu vzdělávání, a to dle podmínek dané země.

Klíčová slova

Vzdělávání pro udržitelný rozvoj; kurikulum; vzdělávací cíle; kompetence v oblasti udržitelnosti; vzdělávací oblasti; taxonomie SOLO.

1. INTRODUCTION

Curriculum policies worldwide are increasingly oriented on competences necessary for employability, personal fulfilment, and active citizenship. Learners' competences represent an ultimate goal and a core of the competence-based curriculum.

Education for sustainable development (ESD) is recognised as an integral element of quality education and, simultaneously, a key to co-creating more just, peaceful and sustainable communities, thus contributing to the implementation of global Sustainable Development Goals (SDGs)[1]. Developing relevant competences of learners and educators is considered a prerequisite for responsible action for sustainable development. Emphasising the leading role of international organisations in ESD, appropriate documents by the UNESCO and the European Commission are used as the reference.

The Framework aims, first of all, to provide a strategic context and conceptual background as well as to identify learning outcomes to be developed at the school. It includes cognitive, social and emotional, and behavioural domains that are all important in holistic education. Transdisciplinary topics related to SDGs provide relevant context for competence development because of their interpretation by different school subjects, from one side, and a focus on authentic, purpose-driven action from another. SOLO taxonomy[2] (*Structure of Observed Learning Outcomes*) ensures relevant reference points for learning and assessing competences, particularly emphasising increasing complexity.

The Framework is not intended to be prescriptive, particularly considering different educational settings, socio-cultural contexts and experiences. It should be considered a flexible guide to be used in reorienting competence-based curriculum to transformative education according to national circumstances.

List of acronyms

EC	European Commission
ESD	Education for Sustainable Development
EU	European Union
GCED	Global Citizenship Education
OECD	Organisation for Economic Co-operation and Development
SDG(s)	Sustainable Development Goal(s)
SOLO	Structure of Observed Learning Outcomes
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNESCO	United Nations Educational, Scientific and Cultural Organization
WSA	The Whole School Approach

[1] United Nations (2015). Transforming our World: The 2030 Agenda for Sustainable Development, A/RES/70/1. https://sdgs.un.org/2030agenda

[2] Biggs, J., Collis, K. (1982). Evaluating the quality of learning: The SOLO taxonomy (structure of the observed learning outcome) New York: Academic Press.

2. STRATEGIC CONTEXT

"36.3. Education, including formal education, public awareness and training, should be recognised as a process by which human beings and societies can reach their fullest potential."

United Nations Agenda 21, Chapter 36

The *United Nations* (UN) *Agenda 21*[3], a comprehensive plan of action to be taken globally, nationally and locally, emphasises the leading role of education in achieving sustainable development. It is also critical for achieving values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. Recognising that countries have different situations and priorities so develop their own schedules for implementation in accordance with their strategies; the common goal is to reorient education towards sustainable development to empower learners to take knowledge-based transformative actions for sustainability.

Sustainable development is an evolving concept and should be seen as a continuous learning and reflection process; therefore, understanding developmental needs and priorities may change as our experience increases. *The 2030 Agenda for Sustainable Development*[4], adopted by all United Nations Member States, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), including a particular goal for education SDG 4: "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all".

Education for sustainable development (ESD) represents an integral component of quality education. It enhances the cognitive, social and emotional, and behavioural dimensions of learning. UNESCO has been the lead United Nations agency on ESD since the United Nations Decade of Education (2005-2014)[5]. The overall 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 helped generate interesting practices and projects. The evaluation of the decade recommended that, among other things, institutional support is needed to scale up and maintain these momentous initiatives.

The Global Action Programme for 2015-2019[6] filled these shortcomings by defining five priority action areas focused on: 1) Advancing Policy; 2) Transforming learning and training environments (whole institution approaches); 3) Building capacities of educators and trainers; 4) Empowering and mobilising youth; 5) Accelerating sustainable solutions at the local level.

How to encourage learners to undertake transformative actions for sustainability has been a major preoccupation for ESD, which is basically citizenship in action. ESD evokes the lifelong learning perspective, taking place not only at school but also outside the school environment, throughout the

[3] UN (1992). Agenda 21: Programme of action for sustainable development. https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

[4] UN (2015). Transforming our World: The 2030 Agenda for Sustainable Development, A/RES/70/1. https://sdgs.un.org/2030agenda

[5] UN (2005). Decade of Education for Sustainable Development, 2005-2014: the DESD at a glance. https://unesdoc.unesco.org/ark:/48223/pf0000141629

[6] UNESCO (2013). Global Action Programme on Education for Sustainable Development (2015-2019) (endorsed by UNESCO Member States through the adoption of 37 C/Resolution 12). https://esdcenter.jp/wp-content/uploads/2016/04/GAP.pdf

life of each individual.[7] Therefore, ESD covers both formal and non-formal education, including citizenship and solidarity.

New guidelines for 2030, *Education for Sustainable Development: A Roadmap*,[8] is focused on the role of education in the achievement of the 17 SDGs through implementing SDG 4, in particular, target 4.7.

> "4.7. By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, 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 of culture's contribution to sustainable development."
>
> *Transforming our World: The 2030 Agenda for Sustainable Development*[9]

SDG Target 4.7 offers the understanding that education, including ESD and GCED[10], can potentially lead to social transformation towards a more just, inclusive and sustainable future. The *Roadmap* promotes interventions in the previous five priority areas with an emphasis on the mainstreaming of ESD in education, networking, mobilising resources and monitoring the progress. However, often, ESD is interpreted with a narrow focus on topical issues rather than with a holistic approach to learning content, pedagogy, and learning outcomes to bring about the fundamental behavioural shift towards sustainable development. "Transformative education involves teaching and learning geared to motivate and empower happy and healthy learners to make informed decisions and actions at the individual, community and global levels".[11]

Other educational strategies of the international level, such as by the OECD and European Union, also emphasize the role of transformative competences.

In the document *Future of Education and Skills 2030* developed by the Organization for Economic Co-operation and Development, there are identified three categories of transformative

[7] UNESCO (2019) Education for Sustainable Development beyond 2019, 206 EX/6.II, Paris, 20 February 2019. https://unesdoc.unesco.org/ark:/48223/pf0000261625

[8] UNESCO (2020). Education for Sustainable Development: A Roadmap (adopted by the 206th UNESCO Executive Board and the 40th UNESCO General Conference and acknowledged by the 74th UN General Assembly) https://www.gcedclearinghouse.org/sites/default/files/resources/200782eng.pdf

[9] Resolution, G. A. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. *UN Doc. A/RES/70/1 (September 25, 2015)*.

[10] "**Education for sustainable development (ESD):** ESD gives learners of all ages the knowledge, skills, values and agency to address interconnected global challenges including climate change, loss of biodiversity, unsustainable use of resources, and inequality. It empowers learners of all ages to make informed decisions and take individual and collective action to change society and care for the planet. ESD is a lifelong learning process and an integral part of quality education. It enhances the cognitive, socio-emotional and behavioural dimensions of learning and encompasses learning content and outcomes, pedagogy and the learning environment itself." https://www.unesco.org/en/education/sustainable-development/need-know

"**Global Citizenship Education (GCED)**: GCED aims to empower learners of all ages to assume active roles, both locally and globally, in building more peaceful, tolerant, inclusive and secure societies." https://en.unesco.org/themes/gced/definition

[11] UNESCO (2022) 5th UNESCO Forum on Transformative Education for Sustainable Development, Global Citizenship, Health and Well-being: recommendations for action towards transformative education. https://unesdoc.unesco.org/ark:/48223/pf0000381592

competences[12] that together address the growing need for young people to be innovative, responsible and aware: 1) Creating new value; 2) Reconciling tensions and dilemmas; 3) Taking responsibility. These transformative competences are complex, so they should be translated into specific constructs (e.g. creativity, critical thinking, responsibility, resilience, collaboration) to better incorporate them into curricula. This *Learning Compass* is an "evolving framework" that will be refined over time by the wider community of interested stakeholders.

In the European Union (EU) strategy, *The European Green Deal*[13], it is stated: "Schools, training institutions and universities are well placed to engage with pupils, parents, and the wider community on the changes needed for a successful transition." The recent *Proposal for a Council Recommendation on Learning for Environmental Sustainability*[14] encourages embedding environmental sustainability in all education and training policies, programmes and processes to build skills and competences needed for the green transition and to contribute to the *Roadmap* by UNESCO.

It should be noted that international documents by UNESCO, OECD, and EU highlight the role of education in achieving global SDGs based on SDG 4. Target SDG 4.7 refers to the transformative competences and, at the same time, provides an unprecedented opportunity to mainstream education for sustainable development into school education. Qualitative indicator 4.7.1 provided in the *Global Indicator Framework*[15] calls for coherence in reorienting key activities towards sustainability: "Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment".

The same indicator 4.7.1 is also attributed to education-related targets of SDG 12 and SDG 13, i.e. "12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature" and "13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning".

[12] OECD (2020). The Future of Education and Skills 2030. https://www.oecd.org/education/2030-project/contact/OECD_Learning_Compass_2030_Concept_Note_Series.pdf

[13] EU (2019). The European Green Deal (Brussels, 11.12.2019 COM (2019) 640 final). https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

[14] EU (2022). Proposal for a Council Recommendation on Learning for Environmental Sustainability (Brussels, 14.1.2022 COM (2022) 11 final). https://education.ec.europa.eu/document/proposal-for-a-council-recommendation-on-learning-for-environmental-sustainability

[15] Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development. https://unstats.un.org/sdgs/indicators/indicators-list/

3. CONCEPTUAL BACKGROUND

> "... it is no longer sufficient to enable learners to acquire discrete knowledge, skills, values, etc."
>
> *Future Competences and the Future of Curriculum*[16]

Learners' competences as learning outcomes represent an ultimate goal and a core of the competence-based curriculum. Understanding of competences is still evolving, encompassing different dimensions of learning, e.g. cognitive, social and emotional, and behavioural.[17]

In the twenty-first century, education faces the challenge of enabling individuals to develop and apply their potential in complex, rapidly changing realities and become responsible co-creators of the future society. An integrated and humanistic approach to education, based on 'four pillars' as presented in the Delors Report[18] is even more important in today's world than before. Actually, dimensions of learning (cognitive, social and emotional, and behavioural) which are reflected in different competence frameworks, found their roots in the 'four pillars'.

Table 1. Four Pillars vs. Dimensions of Learning

Four Pillars (UNESCO, 1996, p. 97)	Dimensions of Learning (UNESCO, 2019)
Learning to know, by combining a sufficiently broad general knowledge with the opportunity to work in-depth on a small number of subjects. This also means learning to learn, so as to benefit from the opportunities education provides throughout life.	**Cognitive:** to acquire knowledge, understanding and critical thinking about global, regional, national and local issues, the interconnectedness and interdependency of different countries and populations, and social, economic and environmental aspects of sustainable development.
Learning to be, so as better to develop one's personality and to be able to act with ever greater autonomy, judgment and personal responsibility. **Learning to live together**, by developing an understanding of other people and an appreciation of interdependence – carrying out joint projects and learning to manage conflicts – in a spirit of respect for the values of pluralism, mutual understanding and peace.	**Social and emotional**: to have a sense of belonging to a common humanity, sharing values and responsibilities, empathy, solidarity and respect for differences and diversity, as well as feel and assume a sense of responsibility for the future.
Learning to do, in order to acquire not only an occupational skill but also, more broadly, the competence to deal with many situations and to work in teams.	**Behavioural**: to act effectively and responsibly at local, national and global levels for a more peaceful and sustainable world.

[16] UNESCO (2017a). Future Competences and the Future of Curriculum. A Global Reference for Curricula Transformation, UNESCO, International Bureau of Education, p. 27. http://www.ibe.unesco.org/en/news/future-competences-and-future-curriculum-global-reference-curriculum-transformation

[17] UNESCO (2019). Educational content up close: examining the learning dimensions of Education for Sustainable Development and Global Citizenship Education. https://unesdoc.unesco.org/ark:/48223/pf0000372327

[18] UNESCO (1996). Learning: The Treasure Within. https://unesdoc.unesco.org/ark:/48223/pf0000102734

Both Four Pillars and Dimensions of Learning require open-ended, emancipatory learning processes, adequate to the post-modernistic society. However, Dimensions of Learning, compared with the process-oriented Four Pillars, are more targeted towards learning outcomes (competences) relevant to sustainable development. A mutual interrelationship and synergy of three learning dimensions (and relevant objectives) actually lead to knowledge- and value-based action.

During the last decades, curriculum policies increasingly focused on competences that students are expected to develop during the whole process of learning. It means a shift from input-oriented to outcome-oriented educational strategies.[19] In educational practice, it means a shift from a teacher-centred approach to a student-centred approach, including teaching-learning-assessment relationships. Competence is traditionally understood as a combination of knowledge, skills, and attitudes to be applied in a defined context or situation.

Within the European Union, the definitions of the elements of competence are extended and described as follows[20]:

- "knowledge is composed of the facts and figures, concepts, ideas and theories which are already established and support the understanding of a certain area or subject;
- skills are defined as the ability and capacity to carry out processes and use the existing knowledge to achieve results;
- attitudes describe the disposition and mindset to act or react to ideas, persons or situations".

Growing complexity, interconnectedness, rapid change as well as uncertainty and risks are characteristic of different spheres of life. In the OECD position paper *The Future of Education and Skills*[21] there are also highlights on complex, evolving circumstances and interdisciplinarity: "Disciplinary knowledge will continue to be important, as the raw material from which new knowledge is developed, together with the capacity to think across the boundaries of disciplines and 'connect the dots'"[22] It implies a shift from subject-specific competences towards general/transversal competences, relevant to all subjects or subject fields.

'Competences' and 'skills' mean different things, although often they are used interchangeably. "Competences are broader in scope. They refer to the ability to use knowledge – understood broadly as encompassing information, understanding, skills, values, and attitudes – in specific contexts and to meet demands"[23].

It is critical that learners can intelligently make connections across elements of competence, integrate, and interactively apply them to respond to contextual demands as well as to change their contexts. An integrity and value orientation are particularly reflected in the definition of competence provided by UNESCO: "Competence is herein defined as the developmental capacity to interactively mobilise and ethically use information, data, knowledge, skills, values, attitudes, and technology to

[19] Tiana, A. (2004) Developing key competencies in education systems: some lessons from international studies and national experiences. In: Developing key competencies in education, p.p.35-80. UNESCO: International Bureau of Education. https://www.voced.edu.au/content/ngv%3A6871

[20] EU (2018) Council Recommendation of 22 May 2018 on Key Competences for Lifelong Learning (Brussels, 2018/C 189/01). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018H0604%2801%29

[21] OECD (2018). The Future of Education and Skills: Education 2030. https://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf

[22] Ibid., p. 5.

[23] UNESCO (2015). Rethinking Education: Towards a Global Common Good? p. 40 https://unevoc.unesco.org/e-forum/RethinkingEducation.pdf

engage effectively and act across diverse 21st century contexts to attain individual, collective, and global good".[24]

For effective development of competences, all learning dimensions – cognitive, socio-emotional and behavioural – need to be developed in conjunction to create synergistic and holistic impacts on learning outcomes.

[24] UNESCO (2017). Rieckmann, M. (ed.) Education for sustainable development goals: Learning objectives. UNESCO publishing, p. 27.

4. COMPETENCES FOR SUSTAINABLE DEVELOPMENT

"Education is no longer just about teaching learners something but about helping them develop a reliable compass and the tools to confidently navigate through a complex, volatile, and uncertain world."

Building the future of education[25]

Sustainable development is not a scientific concept but rather a general political commitment to ensure human well-being, societal health and limited environmental impact. It requires active, creative, and critical citizens who are good at overcoming problems and conflicts in cooperation and are able to combine theoretical knowledge with practical innovations and ideas. Education is the most powerful instrument for change towards sustainability both at the personal and societal levels. The set of 17 SDGs covers all the key challenges important for societal transformation. Transformative education also requires different educational methods rooted in the local socio-cultural contexts and engaging learners as researchers or co-developers of practices.

To be efficient, education should reflect the principles of sustainable development itself. While there could be various interpretations of sustainability principles, depending on specific implementation area, the following four principles are fundamental:[26]

- the normativity principle;
- the equity principle;
- the integration principle;
- the dynamism principle.

Sustainability principles bring essential aspects to all learning dimensions (cognitive, social and emotional, and behavioural) and corresponding constructs of learning outcomes (competences).

The humanistic values, such as respect for life and human dignity, equal rights and social justice, cultural and social diversity, and a sense of human solidarity and shared responsibility for our common future, are equally important for sustainable development and ESD. On the other hand, an initiative for positive change in the community requires considering citizenship as an indispensable component of ESD.

Sustainable development always implies societal and normative choices, which are ultimately based on values. These values cannot be taught directly. Instead, learners should be provided experiences of a personal relationship with the issue under consideration. Authentic learning environments like nature, social and cultural environments, cultural heritage, and the arts are critical elements of ESD and the competence-based curriculum.

A holistic worldview requires inter- and transdisciplinary approach in education in order to address complexities in exploring social, cultural, economic and environmental issues. Rapid changes

[25] OECD (2022). Building the future of education, p. 3. https://www.oecd.org/education/future-of-education-brochure.pdf

[26] Waas,T., Hugé, J., Verbruggen, A., Wrigh, T. (2011) Sustainable Development: A Bird's Eye View. Sustainability, 3, 1637-1661. https://www.mdpi.com/2071-1050/3/10/1637

in different areas of life call for continuous learning and reflection processes, exploring controversial issues and dilemmas, where appropriate decisions and solutions may change as our experience increases.

SDGs, as a reflection of the complex trends in sustainable development, are transdisciplinary. They provide an opportunity to concentrate teaching and learning on real-world problems or themes, involving all relevant disciplines. Current situations or students' own interests often generate the starting point. Cross-curriculum connections make learning more holistic and meaningful for learners. Certainly, there is a possibility to introduce SDG topics in single subject. However, there is a risk of limited (one-side) interpretation and additional time needed in the subject syllabus.

Integration of SDGs in the curriculum doesn't mean inserting new thematic modules into an already overcrowded curriculum or minimising the importance of academic content. Instead, it is about reorienting subjects to achieve higher-order learning outcomes through a double-purpose process: students acquire subject knowledge and skills and, at the same time, learn how to contribute to a sustainable transformation of society.

There is general agreement on eight key competences for sustainability that allow a person to engage constructively and responsibly with today's world.[27] Key competences are understood as transversal (context-independent) and include the following: Systems thinking, Anticipatory, Normative, Strategic, Collaboration, Critical thinking, Self-awareness, Integrated problem-solving. A targeted selection of key competences (transformative competences) represents a distinctive feature in relation to the competence-based curriculum[28].

The European Commission (EC) is committed to meeting the SDGs, and quality education (SDG 4) is a key to achieving all SDGs. Recently, EC presented two competence frameworks which are compatible with sustainable development, i.e. *LifeComp*[29] and *the European Sustainability Competence Framewo*rk, i.e. *GreenComp.*[30] These frameworks cover competences needed by learners of all ages to live, work and act in a sustainable manner.

However, particularly at the school level, it is crucial to ensure a holistic learning experience based on a balance of interrelated cognitive, socio-emotional and behavioural components. For this reason, as well as taking into account *LifeComp* and *the GreenComp* as well as *Future of Education and Skills 2030,*[31] the following constructs of competences are presented in Table 2 and described in Annex 1.

[27] UNESCO (2017). Rieckmann, M. (ed.) Education for sustainable development goals: Learning objectives. UNESCO publishing. https://unesdoc.unesco.org/ark:/48223/pf0000247444_eng

[28] "**Competency-based curriculum**: a curriculum that emphasizes the complex outcomes of a learning process (i.e. knowledge, skills and attitudes to be applied by learners) rather than mainly focusing on what learners are expected to learn about in terms of traditionally-defined subject content. In principle such a curriculum is learner-centred and adaptive to the changing needs of students, teachers and society. It implies that learning activities and environments are chosen so that learners can acquire and apply the knowledge, skills and attitudes to situations they encounter in everyday life. Competency-based curricula are usually designed around a set of key competences/competencies that can be cross-curricular and/or subject-bound."
http://www.ibe.unesco.org/en/glossary-curriculum-terminology

[29] EC (2020) LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence. doi:10.2760/302967, JRC120911.
https://publications.jrc.ec.europa.eu/repository/handle/JRC120911

[30] EC (2022). The European sustainability competence framework. doi:10.2760/13286, JRC128040.
https://publications.jrc.ec.europa.eu/repository/handle/JRC128040

[31] OECD (2020). The Future of Education and Skills 2030.
https://www.oecd.org/education/2030-project/contact/OECD_Learning_Compass_2030_Concept_Note_Series.pdf

Table 2. Dimensions of Learning vs. Key Abilities

Competences for sustainable development	
Dimensions of Learning	**Key Abilities**
Cognitive	Critical thinking; Systems thinking; Creative thinking
Social and emotional (personal)	Communication; Collaboration; Solidarity
	Reflexivity; Value-orientation; Responsibility
Behavioural	Exploring alternative futures; Innovative decision; Transformative action

In this context a holistic perspective should also be emphasised: the Framework covers a complex of equally relevant, interrelated and interdependent learning outcomes. To cope with any given situation, individuals activate several abilities, which will vary to address the demands of each circumstance. The values embedded in cultures form a foundation for personal and social development.

Useful internet resources on SDGs, including those for educators and recommendations for action, are presented in Annex 2.

Assessment of a competence seems to be the main challenge in the competence-based curriculum. A competence means the proven ability of the learner to apply knowledge and skills in value-driven activities, including different learning settings and real-life situations. In order to capture progression in competence development, a relevant taxonomy is necessary. In the Framework SOLO taxonomy[32] is recommended as a basis for the description of learning outcomes. SOLO stands for Structure of Observed Learning Outcomes and describes progressive levels of student achievements.

SOLO taxonomy stimulates the creation of a relational context and relational learning processes to foster transformative sustainability education. Within 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 low to high levels of competence development. The focus is on depth and quality of understanding rather than quantity of information. It should be emphasised that the direction of increasing complexity is a basis for systems thinking.

Similar logic is used in describing the student's action, starting from the declarative knowledge and action according to instruction/ example – to planning and implementation of innovative activity as well as reflection in a context of sustainable development/ the SDGs (see Table 3).

[32] Biggs, J., Collis, K. (1982). Evaluating the quality of learning: The SOLO taxonomy (structure of the observed learning outcome) New York: Academic Press.

Table 3. Characteristics of SOLO levels

SOLO levels					
Dimensions of learning	Elements of competence	Uni-structural	Multi-structural	Relational (systemic)	Extended Abstract
		Surface learning		Deep learning	
Cognitive	Knowledge and understanding (application)	Disciplinary, procedural	Multi-disciplinary, procedural	Inter-disciplinary, epistemic	Trans-disciplinary/ contextualised, epistemic
Behavioural	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

In order to motivate, empower and guide learners to transform themselves and society, teachers should acquire not only competences for sustainable development as defined for learners. In addition, they need so-called 'ESD competences' for implementing action-oriented pedagogical practices and general knowledge about sustainable development.

The UNECE framework of the competences for educators[33] (not only for teachers) serves as guidelines to facilitate learners to become change agents towards sustainability. A range of core competences is presented explicitly, systematically and comprehensively, and clustered around three essential characteristics (UNECE, 2011):

- a holistic approach, which seeks integrative thinking and practice;
- envisioning change, which explores alternative futures, learns from the past and inspires engagement in the present;
- achieving transformation, which serves to change the way people learn and in the systems that support learning.

The set of competences for educators is not intended to prescribe behavioural outcomes; it provides a framework for the professional development of educators. It is suggested to adopt a whole school approach for the continuing professional development of educators in their workplace.

[33] UNECE (2011) Learning for the future. Competences in ESD for educators, ECE/CEP/AC.13/2011/6 http://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publication.pdf

5. IMPLEMENTATION

The whole school approach[34] (WSA) is recognised (both by UNESCO and the EU) as the most efficient approach in competence development because of the synergy of different components of school activities. WSA brings together learning motivation, content and process, as well as guides how things are decided and managed at the school, leading learners to "learn what they live, and live what they learn".

WSA aims to integrate sustainability issues structurally and coherently into the school organisation. It provides unique opportunities for capacity-building, competence development and value education for both learners and teachers. It also promotes close relations with the surrounding society to improve the quality of the provided education. Ultimately, action competence represents the main outcome that could be achieved by the synergy of all components of school life.

As a coherent strategy for school activities, WSA promotes an innovative, democratic learning environment that is responsive to community needs and involves various interested parties in and around the school. Experiences at the school create a living model of a sustainable society and serve as leadership and citizenship training.

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[34] **Whole School Approach** involves addressing the needs of learners, staff and the wider community, not only within the curriculum, but across the whole-school and learning environment. It implies collective and collaborative action in and by a school community to improve student learning, behaviour and wellbeing, and the conditions that support these. http://www.ibe.unesco.org/en/glossary-curriculum-terminology

Annex 1

Key ability	Description
Cognitive	
Critical thinking	to question and evaluate ideas, solutions, norms and practices; identify strengths and weaknesses of evidence, arguments, claims and beliefs; reflect on own one's values, perceptions and actions; take a position in the sustainability discourse according to the sustainability criteria.
Systems thinking	to recognise and understand relationships; analyse complex systems; research how systems are embedded within different fields and different scales; and deal with uncertainty.
Creative thinking	to approach a problem or challenge from a new perspective, alternative angle, or with an atypical mindset ("think outside the box"); engage productively in the generation, evaluation and improvement of ideas that can result in original and effective solutions; reflect and assess the appropriateness of the chosen alternative and its possible consequences.
Social	
Communication	to communicate respectfully and constructively in different environments (including multicultural); utilise multiple media and technologies as well as networking tools; express and understand different viewpoints; be tolerant and prepared both to overcome prejudices and to compromise.
Collaboration	to identify team members/ stakeholders and their interests; motivate and facilitate participatory decision-making and commitment for implementation; work effectively in diverse teams by distributing responsibilities and leadership; exercise negotiation and consensus building in conflict resolution.
Solidarity	to understand and respect the different values, needs and perspectives of individuals/ groups; debate and explore equity and justice in resolving dilemmas and conflicts; facilitate social cohesion; collaborate with others in the common or public interest, including the sustainable development of society.
Personal	
Reflexivity	to reflect on one's own role in the local community and (global) society; to continually evaluate and further motivate one's actions; and to deal with one's feelings and desires with empathy.
Value -orientation	to identify and clarify values, understand and reflect on the norms and values that underlie one's actions; negotiate sustainability values, principles, goals, and targets as well as make appropriate decisions and judgments; and act in accordance with such judgements.
Responsibility	to promote and support human rights, social and cultural diversity, and to take responsibility for the environment; to evaluate the consequences of their own actions and of collective actions; handle obstacles and change; and participate in civic and social life.
Behavioural	
Exploring alternative futures	to understand and evaluate multiple futures – possible, probable and desirable; create one's own visions for the future; apply the precautionary principle; deal with uncertainties, risks and dynamic situations.
Innovative decision	to search for new information; design and evaluate scientific inquiry within complex systems; develop new knowledge, insights, ideas, techniques, strategies and solutions and apply them in real-life situations; make informed decisions based on data/ evidence, scientific arguments and value clarification.
Transformative action	to apply different approaches to complex sustainability problems and develop viable, inclusive and equitable solution options that promote sustainable development; collaboratively plan, mobilise resources (people and things) and implement innovative actions that further sustainability at the local level and further afield.

Annex 2

About SDGs

- https://sdgs.un.org/goals
- https://sdghelpdesk.unescap.org/e-library
- https://sdg-education.net/en/
- https://sdg.humanrights.dk/en/goals-and-targets
- https://www.undp.org/sustainable-development-goals

Resources on SDG for educators

- https://en.unesco.org/themes/education/sdgs/material/
- https://en.unesco.org/themes/education-sustainable-development/what-is-esd/sd
- https://unesdoc.unesco.org/ark:/48223/pf0000247444_eng
- https://worldslargestlesson.globalgoals.org/about-us/
- https://globalgoalscentre.org/resource-hub/
- https://app.participate.com/pages/sustainable-development-goals-teacher-guide
- https://oxfamilibrary.openrepository.com/handle/10546/620564
- https://aroundersenseofpurpose.eu/

Take action!

- https://www.un.org/sustainabledevelopment/takeaction/
- https://www.globalgoals.org/take-action/
- https://www.academia.edu/37826350/Positive_Actions_for_the_Sustainable_Development_Goals
- https://sites.ungeneva.org/170actions/climate/#allgoals
- https://sdg-action.org/
- https://sdgs.scout.org/#goals
- https://www.un.org/sustainabledevelopment/sustainable-development-goals/
- https://act4sdgs.org/
- https://sdgsinaction.com/
- https://www.sdgactioncampaign.org/
- https://www.goalsproject.org/
- https://go-goals.org/

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