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A rapid assessment of curricula for general education focusing on cross-curricular themes and generic competences or skills

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A rapid assessment of curricula for general education focusing on cross-curricular themes and generic competences or skills

Massimo Amadio¹

This paper presents the results of a quick mapping of a range of curriculum frameworks, policies and provisions around the world. The mapping shows that environmental and sustainability issues are reflected in the general goals of education in many countries and that cross-curricular themes related to environment and sustainability are one of the most common transversal themes of general education curricula. It also shows that generic competences or skills are increasingly emphasised as broader learning outcomes that all students are expected to develop beyond the conventional subject-based learning. Concluding remarks highlight some of the complex and not yet resolved issues related to the implementation of these innovative approaches.

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Introduction

This rapid assessment looks at how national curricula for general education are reflecting concerns about environmental and sustainability issues and are emphasising the need for general competences/skills to be developed across the curriculum. The main purpose is to map curriculum information into a dataset that attempts to address the following issues: (i) identify countries that include cross-curricular/transversal themes in their general education curricula and, among them, those making provision for themes and topics related to environmental issues; (ii) analyse the extent to which countries' curriculum frameworks and general education curricula take into account of a set of selected cross-curricular competences/skills – including those related to environmental awareness or responsibility; and (iii) identify countries that explicitly mention environmental and sustainability issues among the general aims and goals of education.

Data sources and methodology

Information on cross-cutting themes, general competences and broad educational aims and goals was assembled using the following main sources: (i) systematized data on curricula and curriculum frameworks for general education (typically primary and secondary education) included in the updated country profiles of the seventh edition of *World Data on Education* (WDE, UNESCO-IBE, Geneva, 2010/12), complemented by information contained in a range of additional curriculum-related materials (mainly curriculum frameworks and curriculum policy documents, see Annex 1); (ii) concerning the broad aims and goals of education, in addition to the WDE profiles a number of education laws/acts and in some cases constitutions and curriculum frameworks, particularly those containing references to broad educational aims were also used.

The materials were coded using the criteria shown in Annex 2. In the context of this rapid assessment of curriculum-related materials, cross-cutting or transversal themes are defined as those topics or themes that are not linked to a specific teaching subject and are to be taught across all subjects, disciplines or learning areas (in some cases 'to be infused' or 'mainstreamed'). This means that curriculum statements referring to specific teaching subjects such as 'environmental education' or to combined subjects (e.g. 'environmental studies', typically comprising social studies and natural sciences) were not coded. Similarly, general competences/skills are defined as those competences/skills to be developed by the students during the whole process of learning across specific subjects, disciplines and learning areas, even if some of them are related to a specific teaching subject/learning area (for example 'communication' and language arts). Therefore, statements referring to competences or skills to be attained within a specific subject or learning area were not taken into account in the coding of the materials.

Countries increasingly refer to a variety of general competences/skills in their curricula and curriculum policy documents, and for the purpose of this quick mapping, a set of 15 competences/skills has been selected. These are: communication (including communication in the mother tongue and in foreign languages); literacy; numeracy; learning to learn; problem solving; critical thinking; creativity (including innovation); collaboration; basic competences in science and technology; digital competence (including Information and

Communication Technologies –ICT); information processing and enquiry skills; entrepreneurship (including ‘sense of initiative taking’); environmental awareness/responsibility; social competence; and civic competence (including citizenship).

Educational legislation and curriculum-related materials were analysed in the original languages (English, French, Portuguese and Spanish) or using translations mainly in English and French when available. It has not been possible to analyse materials produced in other national languages, in particular those available in Arabic and Russian only. Finally, it is important to bear in mind that the analysis of technical and vocational education and training curricula (TVET) and National Qualifications Frameworks was beyond the scope of this rapid assessment (for an analysis of initial VET curricula and NQFs focusing on European countries, see for example CEDEFOP 2010 and 2012).

Findings

A) Cross-curricular themes on environmental issues

In general, contemporary curriculum frameworks that do not relate to a particular subject² provide a description of the fundamental elements that are to be taken into account in the planning and organization of the curriculum and that are expected to serve as a basis for the definition and implementation of the school curriculum and for the planning and organization of the teaching and learning process. They usually contain statements related to the vision, principles, national education guidelines – including provisions on specific issues such as language policy and students with special educational needs –, broad education goals and objectives, as well as underpinning values that can include, depending on the country, equity, inclusion, responsibility, integrity, respect, solidarity, and identity. They describe the different educational levels, stages or cycles, and the related learning expectations in terms of knowledge, understanding, skills and attitudes, increasingly focusing on outcomes instead of inputs. Also, these documents increasingly organize the curriculum around core learning areas rather than providing a list of disciplines or teaching subjects, propose a number of cross-curricular themes/topics, and make reference to general or transversal competences/skills that are to be developed across the whole curriculum.

Furthermore, these frameworks usually advocate innovative approaches to teaching and learning, with a growing emphasis on active, shared and collaborative learning; learner-centred approaches; supportive learning environments; provision of sufficient opportunities to learn; and assessment as, for and of learning. Obviously, curriculum frameworks express intentions that are to be translated into concrete actions. However, a significant body of evidence shows that a number of challenges and issues arise at the level of implementation, for example, in the areas of teachers’ preparation, teaching approaches, learning environments, and assessment systems (particularly with regard to cross-curricular themes and competences).

² The term ‘curriculum framework’ is also used to indicate an organized plan or set of standards or learning outcomes that defines the content to be learned in a specific subject area.

In curriculum frameworks, statements and policies countries typically refer to cross-curricular or transversal themes³ as a means to: reduce fragmentation and connect programmatic content across disciplinary boundaries; enrich the curriculum without overloading it through the introduction of additional teaching subjects; facilitate interdisciplinary thinking and collaborative learning; and, especially in general lower and upper secondary education, as a way to promote teamwork among teachers from different disciplines and facilitate collaborative approaches to planning learning experiences that reinforce the collective responsibility for students' learning. In some cases (for example New Zealand) transversal themes are seen as a way to deal with issues that are relevant to students' future, to foster connections across learning areas and values, and also to contribute to the development of key competences.

Through the mapping of curriculum frameworks and related materials it has been possible to identify at least 71 countries/jurisdictions that include transversal themes in the curriculum for general education. Out of this total, it is worth noting that in 57 cases environmental and sustainability issues – which often are also a component of specific content areas and subjects – are to be dealt with as a cross-curricular theme, and this is possibly one of the most common transversal themes. As shown in Table 1, a variety of terms are used to refer to these environment-related themes. By grouping them into broad categories, it can be observed that themes referring to sustainable development issues are the most emphasised (23 cases) and are presented using many different labels including, among others, education for sustainable development (ESD), sustainable development, sustainability, education for sustainable development and global citizenship, sustainable environmental development, and environmental culture for sustainable development. The typical 'environmental education' is mentioned in 17 cases. In the other 17 cases the terms generically refer to the 'environment' or to the environment in combination with other elements (e.g. environmental protection, preservation or awareness; environmental issues; health; safety; risk management).

Probably also due to the influence of the UN Decade of Education for Sustainable Development, sustainability issues are seen as an important aspect of the training of competent and self-confident individuals and cosmopolitan citizens (for example, 'environmentally conscious citizens who are committed to a sustainable way of life' in the case of Finland), as it is necessary to prepare learners for the future challenges that they will have to face at the local and global level and help them to understand the complex and interrelated nature of their world. Therefore, learning outcomes or standards specifying what students should know and be able to do to be 'environmentally and sustainability literate' are also defined for and included within specific learning areas/disciplines such as social and personal development, natural and social sciences, technology, and in particular civic and citizenship education. For example, a recent analysis of curricula in six Latin American countries⁴ conducted within the framework of the International Civic and Citizenship Study–2009 (Cox Donoso 2010), shows that civic and citizenship education curricula at primary and secondary level comprise environment and sustainable development topics. Moreover, in recent years sustainable development has become one of

³ Other definitions include cross-curricular topics, areas, dimensions, domains, issues or priorities. In the Spanish-speaking countries of Latin America they are commonly defined as *temas* or *ejes transversales* (transversal themes or axes).

⁴ The countries are Colombia, Chile, Dominican Republic, Guatemala, Mexico and Paraguay.

the most common themes among contemporary and emerging issues addressed by citizenship education in European countries (Eurydice 2005, EACEA/Eurydice 2012). In this regard, it is important to recall that within the European reference framework of key competences for lifelong learning adopted in December 2006, 'civic competence' also implies constructive participation which "also involves civic activities, support for social diversity and cohesion and sustainable development, and a readiness to respect the values and privacy of others." (European Parliament 2006).

Expected learning outcomes usually include a combination of knowledge, understanding, values, skills, attitudes and general competences (the latter can include critical thinking and problem solving, creativity, and systemic thinking, among others). In the case of Lesotho, for instance: learners are expected to develop knowledge and skills towards sustainable use of the environment for individual and societal development; they should be helped to: understand and appreciate the biophysical, political, social and economic parts of the environment and their interrelationships; and they are to develop appropriate skills and positive attitudes to interact sustainably with the environment for socio-economic development. As for Finland, pupils in basic education are expected to: understand the prerequisites for human wellbeing, the necessity of environmental protection, and the relationship between the two; learn to observe changes taking place in the environment and human wellbeing, and to act for the good of the living environment and the enhancement of wellbeing; learn to evaluate the impact of their consumption and daily practices, and adopt the courses of action required for sustainable development; learn to promote wellbeing in their own communities and to understand the threats to, and potential for, wellbeing at a global level; and learn to act constructively for a sustainable future. The objectives for upper secondary students are to: be familiar with the key factors of the ecological, economic, social and cultural dimensions of sustainable development; know how to measure, assess and analyse changes occurring in both the natural environment and the cultural and social environments; reflect on what constitutes a sustainable lifestyle, an environmentally friendly and eco-efficient production and community; be able and willing to act for sustainable development in their own everyday life and as students, consumers and active citizens; and be able to cooperate for a better future on local, national and international levels. In the case of Mexico, pupils in basic education are expected to: develop a critical view of lifestyles; recognise the biological and cultural diversity of their community, including the natural heritage; identify vulnerability and environmental risks in their local area; make decisions, as far as possible, to prevent, reduce and mitigate environmental problems through strategies such as sustainable consumption. They have to understand the relationship between society and nature to promote sustainable development, which also implies being able to recognize that they are part of the environment and can take action to favour sustainable development and contribute to the improvement of environmental conditions of their neighbourhood. They also have to value natural diversity, recognise the importance of biodiversity conservation, and be actively committed to its protection.

In terms of provision, environmental and sustainability issues are typically expected to be integrated into the learning process using an interdisciplinary approach. In addition to theoretical aspects, it implies an emphasis on activities designed for real life situations, out-of-school work, implementation of sustainable development projects that engage the community, case studies and surveys (in some cases there is also a focus on indigenous

knowledge and practices), group and collaborative work, and actual adoption of sustainable lifestyles.

Beyond general statements about innovative teaching approaches and forms of assessment, specific references to teachers' preparation and evaluation of learning outcomes regarding cross-cutting themes were not found in the curriculum frameworks analysed. This can be explained by the fact that normally teacher education standards and assessment standards and strategies are specified in separate documents and provisions. Nevertheless, it is clear that a number of issues exist in the preparation and expertise of teachers, as well as in the assessment of students (particularly at the secondary level) when it comes to integrating and implementing cross-cutting themes in the curriculum (CIDREE 2005, Venville et al. 2001).

B) Cross-curricular competences/skills

There is a growing emphasis worldwide on the need to equip learners with a set of key competences⁵ or essential skills, also defined as '21st century skills', that are necessary to succeed in education and for personal development, employment and inclusion in a knowledge society. Except for ICT-related skills, most of these key competences are not really new and have been valued and taken into account for a long time. What is relatively new is the increased attention paid to the application of knowledge and skills to 'real life situations' as well as to the labour market demands arising from the changes in society due to the globalized economy and the information age.

This new focus also reflects the shift from educational inputs to learning outcomes, including the generic competences that all students need for life and work in contemporary society and that are increasingly valued by employers along with academic knowledge, cognitive abilities and technical skills. In addition to key competences such as communication, critical thinking, creativity, collaboration and digital literacy, a number of non-cognitive skills and personality attributes, qualities and behaviours that can be used in different types of jobs (e.g. time management, punctuality, integrity, sense of responsibility, empathy, etc., sometimes referred to as 'soft' or 'employability' skills), are also often mentioned. Different organizations, including partnerships and consortia, have defined and endorsed core or key competences/skills frameworks using different foci, emphases, groupings and terminologies⁶, which may contribute to generating ambiguity and uncertainty. There is also an on-going debate, frequently with conflicting visions, as well as an increasing amount of studies and analyses devoted to issues concerning the reform of school curricula focusing on key competences/skills and the significant challenges involved, especially in terms of implementation and assessment⁷.

⁵ Within the European Union, competences are defined as a combination of knowledge, skills and attitudes appropriate to the context. Key competences are those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment. (European Parliament 2006).

⁶ See: Binkley et al. 2010, Delors et al. 1996, European Parliament 2006, ILO 2007, OECD 2005, Partnership for the 21st Century Skills 2009, UNESCO 2004, WHO 2001.

⁷ See: Ananiadou & Claro 2009, CIDREE 2008, Dede 2010, European Commission/EACEA/Eurydice 2012, Finegold & Notabartolo 2010, Gordon et al. 2009 and 2012, National Research Council 2012, Pepper 2011 and 2012, Silva 2008, Voogt & Roblin 2010, Wang 2012, Yates & Young 2010.

In general, it is recognized that many of these key competences overlap and support each other. They are viewed as being, to some extent, transferable, even if it is not yet clear the range of contexts across which cognitive and non-cognitive competences should transfer and how learners can be supported in transferring competences across disciplines (National Research Council 2012). It is frequently recommended that a cross-curricular approach be adopted for the development of key competences, although some of them (for example communication, literacy, numeracy) tend to be seen as closely related to traditional subjects and are emphasised especially in 'core' learning areas such as language arts, mathematics and sciences; other competences (for example learning to learn, critical thinking, problem solving) tend to be viewed as more transversal in nature and are to be developed across all subjects and disciplines. In addition, within a set of key competences, some can be considered more important or fundamental than others since they also support learning in the different subject areas, and in different frameworks similar competences or skills are attributed varying levels of prominence (Voogt & Roblin 2010). It is also important to bear in mind that similar labels or keywords can be interpreted in many different ways. For example, there is a lack of consensus regarding the definition of 'critical thinking' and there is no single widely accepted definition of 'creativity' (Lai & Viering 2012).

The European Union (EU) Reference Framework sets out eight key competences⁸ for lifelong learning, considers basic skills in language, literacy, numeracy and in information and communication technologies (ICT) as an essential foundation for learning, and underlines that 'learning to learn' supports all learning activities. Furthermore, critical thinking, creativity, initiative, problem solving, risk assessment, decision taking, and constructive management of feelings – defined in the Framework as 'themes' – pervade all eight key competences (European Parliament 2006). In their comparative overview of policy and practice concerning the implementation of key competences in 27 EU education systems, Gordon et al. (2009) observe that four competences (e.g. communication in the mother tongue, communication in foreign languages, mathematical competence, and basic competences in science and technology) tend to be anchored in subject-based curricula and are viewed as 'traditional' competences; the other four competences tend to need a higher degree of cross-curricular organization; and the 'themes' of the EU Framework are seen as transversal competences or skills. They further note that the distinction between subject-based and transversal competences is not very clear, and that the interpretation given to 'attitudes' (an important component of competence along with knowledge and skills) in each country can be very different (2009, p. 195). In analysing the replies to a questionnaire survey involving 17 OECD countries and regions, Ananiadou & Claro (2009) found that virtually all the participating countries recognize the relevance of 21st century skills and competences. Most countries reported that these skills are integrated across the curriculum although they "do not provide a clear answer to how these skills and competencies are defined in their documents or simply state that such national definitions do not exist." (2009, p. 13).

Given the complexities and complications involved, the rapid mapping of curriculum frameworks, policies and provisions concentrated on coding references to labels of the

⁸ The eight key competences are: communication in the mother tongue; communication in foreign languages; mathematical competence and basic competences in science and technology; digital competence; learning to learn; social and civic competences; sense of initiative and entrepreneurship; and cultural awareness and expression. (European Parliament 2006).

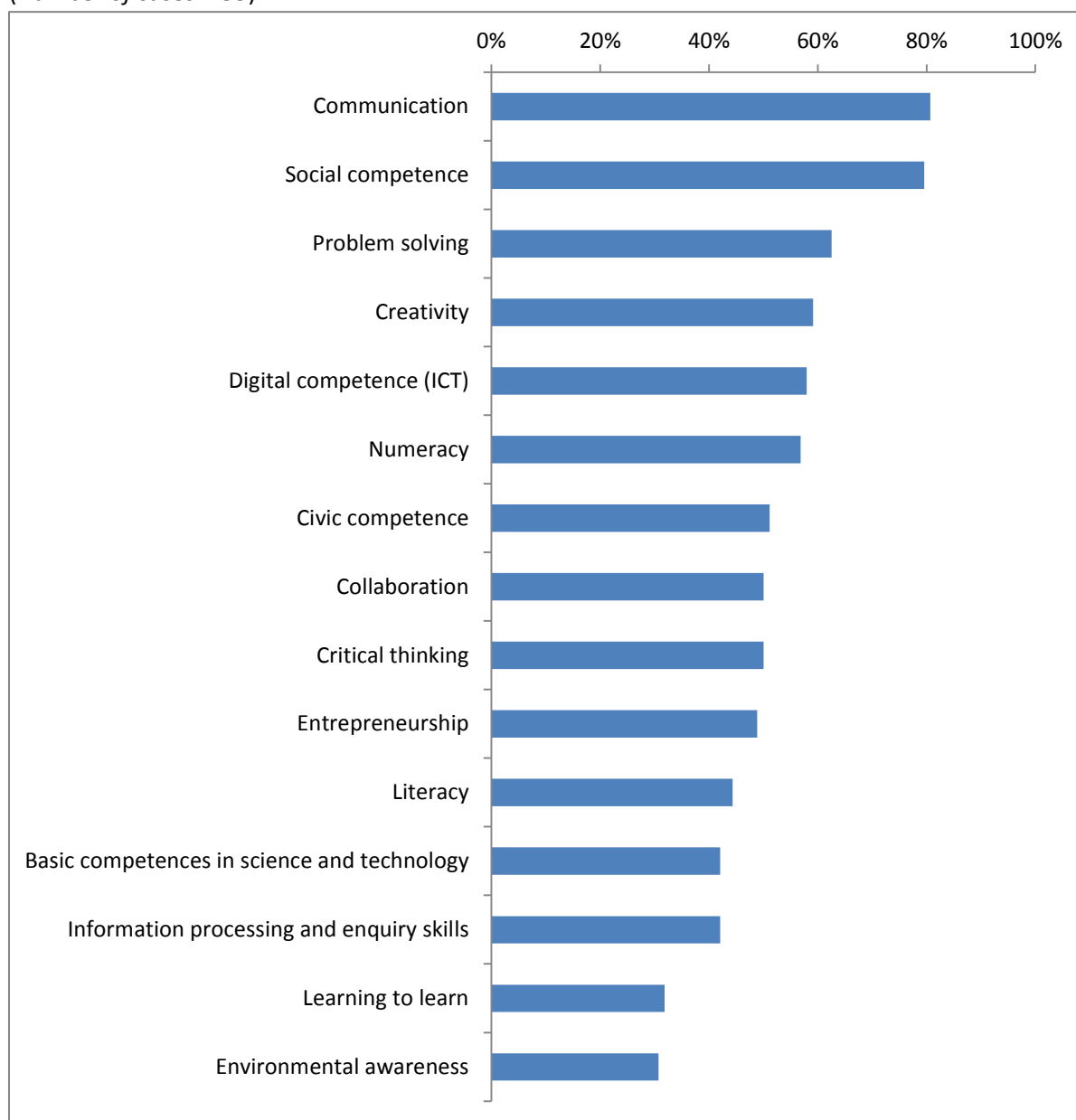
selected competences or skills that are presented in the documents as cross-curricular or transversal competences. Overall, it has been possible to identify at least 88 countries/jurisdictions that make reference to core competences/skills that students are expected to develop across curriculum areas, disciplines and subjects. As shown in Table 2, these countries use a variety of terms, the most frequent ones being competences or competencies (defined as key, core, general, generic, basic, cross-curricular or transversal competences) and skills (defined as key, foundation, core, basic, essential, cross-thematic, cross-curricular or 21st century skills).

The figure below shows the extent to which countries emphasise the selected cross-curricular competences. Communication – which often implicitly includes literacy – and social competence are by far the most highlighted (in 71 and 70 cases, respectively), which is not surprising as socialization is one of the central functions of education. A considerable emphasis is also placed on problem solving (55 cases), creativity (52 cases), digital competence–ICT (51 cases), and numeracy (50 cases). With regard to digital competence, which can be seen as a true 21st century skill, it should be recalled that ICT are frequently taught as one specific subject. ICT are increasingly used to support learning in other content areas and also to support the development of other competences such as communication, creativity, information processing and enquiry skills. About one half of the countries make reference to civic competence, collaboration, critical thinking and entrepreneurship. Countries place slightly less emphasis on literacy (39 cases) and on basic competences in science and technology and information processing and enquiry skills (both mentioned in 37 cases). Explicit references to learning to learn and environmental awareness were found in 28 and 27 cases respectively⁹.

⁹ With regard to ‘learning to learn’, Gordon et al. (2009) note that this competence “is considered everywhere as fundamental and crucial, but it is not explicitly expressed as such in many [European] countries, mainly because there is some uncertainty about the best way it can be acquired and how to assess its attainment.” (p. 196).

Frequency of references to selected cross-curricular competences/skills

(Number of cases = 88)



C) Broad educational aims and goals related to the environment

As shown in Table 3, at least 64 countries/jurisdictions include statements related to the environment among the general aims and goals of education, e.g. broad aims not closely related to a specific educational level or discipline. The most emphasised goals refer to the role of education in promoting and fostering learners' commitment to the protection, conservation and preservation of the environment (in several cases all these aspects are mentioned), and in contributing to environmental sustainability or sustainable development. Other values or attitudes towards the environment that education should encourage among

learners include respect, awareness, caring for/safeguarding, appreciation, and rational use of natural resources.

In general, official statements range from a concise reference to the environment, e.g. “increase awareness and appreciation of the natural environment” (St. Kitts and Nevis, St. Lucia), to more elaborated descriptions, such as: “the aim of the curriculum is to provide the scientific knowledge and skills, and attitudes and values needed to ensure that the environment is respected and sustained; and to develop the ability to make environmentally wise choices in terms of family development, as well as in economic activities” (Namibia, National Curriculum for Basic Education 2010); “the curriculum emphasises the need to develop environmentally, economically and socially sustainable practices that value and sustain biodiversity and life-supporting ecological processes; opportunities will be provided to ensure students have the knowledge and skills to contribute to sustainable nation building so that Tokelau adapts well to global influences.” (Tokelau, National Curriculum Policy Framework 2007).

Environment-related goals are mentioned by all Spanish-speaking countries of Latin America. They also make reference to environmental protection or conservation in their constitutions (this also applies to the constitutions of Belize, Guyana and Haiti). In the case of Brazil, the federal constitution provides for the promotion of environmental education in formal and non-formal education and for public awareness of environmental protection. The Federal Law n° 9.975 of 1999 further specifies that environmental education shall not be implemented as a specific discipline but rather as an integrated, holistic and permanent educational practice aimed at promoting, among others, an integrated understanding of the complex interplay between the environment, economy, politics, culture and society as well as the democratic and responsible participation of individuals and communities in environmental protection as part of an active citizenship for building a society based on the principles of freedom, equality, solidarity, democracy, social justice, responsibility and sustainability.

The presence of educational goals related to the environment is also evident in countries in the region of Central and Eastern Europe. For example, the educational values underpinning the National Curriculum Framework of Croatia (2010) arise from the commitment to create a knowledge based society that will enable sustainable development. One of the general goals of education in Lithuania, as stated in the Education Law of 2006, is to reinforce the capability of society to ensure sustainable development of the country’s economic, environmental and human resources. In the Czech Republic, the Education Act of 2004 includes among the main goals of education: the acquisition and application of knowledge of the environment and its protection, arising from the principles of sustainable growth and of safety and the protection of health. In other cases, the emphasis is placed on the role of education in promoting a responsible attitude towards the environment (Kosovo, Republic of Moldova) and in raising environmental awareness. In Serbia, for example, the

Law on the Foundations of the Education System (2009) stipulates that one of the main objectives of education is to raise awareness about the importance of sustainable development, protection and preservation of nature and environment, ecology-related ethics and the importance of animal protection.

Based on the coding of materials and the keywords presented in Table 3, statements related to the environment can be grouped into three main categories or dimensions: (i) goals emphasising applications and actions (e.g. protection, preservation, conservation, restoration, enhancement, improvement, rational use, etc.); (ii) goals stressing values, attitudes and knowledge (e.g. appreciation, awareness, respect, care for, responsibility, etc.); and (iii) goals underlining sustainability issues such as sustainable development, environmental sustainability, sustainable environment, sustainable growth and sustainable management. As shown in Table 4 below, overall environment-related goals equally emphasise the dimensions of applications/actions and values and attitudes (42 cases for each category). In 33 cases, statements encompass more than one dimension and refer more frequently to sustainability issues.

Table 4. Educational goals related to environment by main dimension

	Number of cases by dimension		
	Applications & actions	Values & attitudes	Sustainability
All statements (N = 64)	42	42	22
Statements highlighting one dimension (N = 31)	13	15	3
Statements encompassing more than one dimension (N = 33)	29	27	19

It is important to take into account that environmental sustainability issues and associated educational goals can be included not only in education laws/acts but also in other pieces of legislation, such as environmental laws and environmental education acts or legislation concerning young people and related policies/programmes. In Finland, for example, the Youth Act 2006 amended in 2010, is aimed at supporting young people's growth and active citizenship (in the context of Finland 'young people' means those under 29 years of age), on the basis of principles including respect for life and the environment among others. One of the overarching themes of the Finnish Ministry of Education and Culture's *Child and Youth Policy Programme 2012-2015* is sustainable development, and within this context active citizenship and global citizenship include not only social and civic activity but also responsible consumer citizenship, protection of human rights, non-discrimination, and environmental responsibility.

Furthermore, national ESD strategies may advocate for the reform of existing curricula and the use of innovative approaches to teaching and learning such as interdisciplinarity, cooperative activities, and experiential and inquiry-based learning (UNESCO 2012). For example, the National ESD Strategy of Luxembourg, released in December 2011, foresees the integration of ESD in formal and non-formal education, teacher training as well as out-of-school activities. The Strategy also proposes the adoption of a competency-based approach for both ESD and the reform of school curricula, and makes reference to generic competences/skills such as critical and creative thinking, informed and ethical decision-making, responsible behaviour, collaboration and cooperative skills, systemic thinking, self-confidence and empathy.

Concluding observations

In a considerable number of countries environmental and sustainability issues are reflected in the general goals of education, and the quick mapping of curriculum frameworks and other related materials shows that these issues are one of the most emphasised cross-curricular or transversal themes. As mentioned, cross-curricular themes are intended to facilitate integrated learning across disciplinary boundaries, foster links across learning areas and possibly also contribute to the development of key competences or skills. In secondary education they are also seen as a way to raise students' interest and motivation by focusing on topics that are relevant to their life and future. However, their implementation faces several challenges and problems.

Quite often teachers already have to deal with a 'congested' or overloaded curriculum. Thus, it may be difficult for them to find enough time and space for transversal themes, as these, in principle, require high levels of teacher and student engagement and interaction. Teachers, and also students and their parents, may have the perception that these themes are an addition, and therefore not really relevant, especially if what students have learned is not formally assessed and is not a component of formal and high-stakes examinations (which is frequently the case). Limited teacher awareness, experience and expertise may represent a sizeable obstacle to the implementation of an interdisciplinary or multidisciplinary approach. And, especially at the secondary level, the well-rooted disciplinary structure of the curriculum – which is also hierarchical as some subjects are seen to be more important than others – and the discipline-based qualifications of teachers can represent a powerful barrier to cross-curricular teaching and learning.

The rapid assessment of curriculum frameworks and materials confirms that outside the EU and OECD areas the (intended) general education curricula also reflect a growing emphasis on generic competences/skills or broader learning outcomes beyond the traditional subject-based learning, indicating that what is expected from education is far more than academic knowledge and cognitive development. There seems to be a consensus on the most important competences – emphasised to different degrees – which all students need for living a productive and rewarding life and being able to successfully face the challenges of an uncertain future. However, there is still some ambiguity, a lack of clarity and of common understanding concerning the definition of many of these generic competences, the relative importance of their components (e.g. knowledge, skills and attitudes), and the range of contexts in which they should be applied.

The majority of studies and analyses focusing on generic competences/skills in EU and OECD countries underline that there are a number of complex and not yet resolved issues related to their practical implementation and assessment. In a discussion paper on 21st century skills, Voogt & Roblin (2010) note that one of the most controversial implementation issues is defining their role and place within the existing discipline-based curriculum and how core subjects and other subjects are expected to contribute to their development. In the case of the European Union, Gordon et al. (2009) claim that competence development policies require sophisticated implementation strategies and that the development of cross-curricular competences is a complex pedagogical task, demanding profound and sustained changes in the organization of the teaching and learning process and the training of teachers, as they have to support students in developing competences and are also expected to have acquired these competences.

The assessment of '21st century skills' or key competences is another critical issue, and the implementation of new assessment approaches is extremely challenging (see Rey 2012 for a description of the difficulties and problems arising from the assessment of key competences in France). In a report focusing on the USA, Silva (2008) argues that measuring 21st century skills on a large scale is not going to be an easy task and will require a larger investment in the development and design of assessments and assessment systems. Gordon et al. (2009) recognize that assessing key competences is a complicated and challenging task, considering that attitudes – one of their main components – are rarely assessed¹⁰, and competences – defined by the context in which they could be utilised – should be assessed to the greatest extent possible in the range of 'real life' contexts. In his analysis of key competences assessment policies in EU countries, Pepper (2011) notes that current assessment tends to concentrate on the 'traditional' key competences (languages, mathematics and science and technology) and on the subjects closely associated to them in a limited range of contexts. He found that it mainly focuses on knowledge and skills, while in principle all the components of a competence should be assessed in interaction rather than in isolation. The other 'transversal' competences are not widely assessed, and the explicit assessment of the 'themes' of the EU Reference Framework (e.g. critical thinking, creativity, problem solving...) is frequently limited and sporadic. He also argues that "key competences should be 'unpacked' into learning outcomes that are specific enough to provide the basis for planning and assessing learning without reducing it to a series of procedural steps. This also means mapping key competences to contexts so that they can be applied within, across and beyond subject contexts." (p. 350). In a literature review on the same topic (Pepper 2012), he cautions that "if only a few competences are assessed, assessment will distort the curriculum, leading to the neglect of other competences. Furthermore, if only limited aspects of these competences are assessed, they will be distorted too. Thus if only knowledge is assessed, the development of skills and attitudes will be, at best, incidental." (p. 2).

In the absence of comprehensive and systematic measures supporting the required changes in the existing teaching, learning and assessment practices, there is a risk that stated expectations and policy intentions embedded in contemporary curriculum reforms focusing on generic competences/skills and cross-curricular themes will only partially be

¹⁰ With regard to the importance of non-cognitive skills and personality traits see also Brunello & Schlotter 2011 and Levin 2012.

reflected in the reality of schooling. According to a regional study on education in Central and Eastern Europe and the Commonwealth of Independent States conducted by UNICEF, despite a number of curriculum reforms and improvements the traditional teacher-led methods still predominate in many countries, and curricula are largely subject- and fact-based, emphasising memorization rather than the development of skills (UNICEF 2007). Similarly, in a study on secondary education curricula, examinations and assessment in Sub-Saharan Africa, the World Bank takes note of positive developments in terms of curriculum reforms emphasising competency development, but reports that changes in the intended curriculum still have a negligible impact on classroom practices, which remain teacher-centred, anchored on the memorisation of facts and restricted to low levels of cognitive learning, while the current assessment and examination practices are limited to the recapitulation of memorized facts (World Bank 2008). Referring to skill development in South-East Asia, Sirohi & Singh (2012) recognize that secondary school curricula and on-going curriculum reforms emphasise a wide variety of skills expected at least to provide a strong base from which students can develop further skills, but also conclude that secondary school graduates often do not possess the skills required for employability and that one of the major gaps identified is teacher effectiveness and attitudes, as “teachers still prefer structured classrooms as against constructivist and interactive classrooms and in mathematics and science lessons more ‘traditional’ activities dominate in almost all countries.” (p. 50).

National education authorities around the world should seriously assess the complex and not yet resolved issues faced by other countries before launching curriculum reforms intended to support the development of generic competences or skills.

Table 1. Terms used to refer to cross-curricular themes related to environment

Transversal/cross-curricular themes related to environment	Country/jurisdiction
environmental education (N=17)	Austria, Belgium (Flemish Comm.), Belgium (French Comm.), Burkina Faso, Czech Republic, El Salvador, Eritrea, Grenada, India, Jamaica, Malaysia, Nigeria, Panama, Paraguay, Philippines, Slovakia, Tanzania (Zanzibar)
education for sustainable development (N=4)	France, Germany, Iraq, Malta
sustainability (N=3)	Australia, Bhutan, New Zealand
sustainable development (N=3)	Guatemala, Lithuania, Mauritius
global dimension and sustainable development (N=2)	Gambia, UK (England)
environmental education for sustainability	Mexico
environmental education for sustainable human development	Uruguay
environmental education, education for sustainable development	Korea Rep.
education for sustainable development and global citizenship	UK (Wales)
responsibility for the environment, well-being and a sustainable future/sustainable development	Finland
sustainable environmental development	Nicaragua
education for sustainability	Slovenia
environment and sustainable development	Estonia
environmental adaptation and sustainable development	Lesotho
environmental culture for sustainable development	Costa Rica
environmental sustainability	Fiji
environment (N=2)	Tanzania (Mainland), Zambia

environmental protection (N=2)	Afghanistan, Ecuador
health, safety and environmental protection	Croatia
environment and quality of life	Côte d'Ivoire
environmental degradation	Ghana
environmental preservation and environmental education	Brazil
education for environmental awareness	Hungary
education for living in harmony with nature and community health	Bolivia
environment and integral health	Venezuela, RB
education for risk management and environmental awareness	Peru
environmental learning	Namibia
environmental issues	Botswana
interdependencies (social, economic, environmental)	Switzerland (<i>Plan d'études romand</i>)
ecological education	Poland
social and natural context	Dominican Rep.

(Total number of cases = 57)

Table 2. Terminology used to refer to cross-curricular competences/skills

Term	Country/jurisdiction
key competences/competencies (N=17)	Croatia, Czech Rep., Gambia, Hungary, Iceland, Italy, Kosovo, Lithuania, Maldives, Malta, New Zealand, Poland, Romania, Slovenia, Spain, Thailand, Tokelau
competences/competencies (N=9)	El Salvador, France, Iraq, Jordan, Mexico, Slovakia, Sri Lanka, Tanzania (Mainland), Canada (Alberta)
transversal competences (N=5)	Austria, Belgium (French Comm.), Côte d'Ivoire, Djibouti, Luxembourg
general/generic competences/competencies (N=4)	Estonia, India, Panama, Tanzania (Zanzibar)
cross-curricular competencies (N=3)	Canada (Québec), Canada (Saskatchewan), Indonesia
core competences/competencies (N=3)	Kenya, Lesotho, Zambia
essential skills (N=6)	Belgium (Flemish Comm.), Brunei Darussalam, Cook Islands, Portugal, Samoa, Seychelles
skills (N=6)	Afghanistan (skills/learning objectives), Grenada (skills/learning goals), Ireland, Malaysia, South Africa, UK (Wales)
basic skills (N=5)	Norway, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Turkey
foundation skills (N=2)	Botswana, Canada (Manitoba)
core skills (N=2)	Korea Rep., Namibia
cross-curricular skills (N=2)	UK (N. Ireland, also 'whole curriculum skills and capabilities'), UK (Scotland)
life skills (N=2)	Cambodia, Nepal
basic competencies	Nicaragua
21st century competencies	Singapore (also 'life-ready competencies')
21st century skills	Philippines
cross-thematic skills	Greece
key skills	UK (England)
citizenship skills	Finland (also 'competences')
framework competencies	Guatemala
general capabilities	Australia (National Curriculum)
essential capabilities	Bhutan
transversal capacities	Switzerland (<i>Plan d'études romand</i>)
generic/overarching learning outcomes	Mauritius
developmental outcomes	Dominica

learning outcomes
major learning outcomes
outcomes
attainment goals
learning goals
basic learning objectives
transversal fundamental objectives
education achievements
pillars/capacities
articulating curriculum axes

Serbia
Fiji
Cayman Islands
Honduras
Hong Kong, SAR of China
Brazil
Chile
Peru
Venezuela, RB
Ecuador

(Total number of cases = 88)

Table 3. Broad educational goals referring to environmental and sustainability issues

Country/jurisdiction	Educational goals related to the environment
Afghanistan	Protection
Algeria	Sustainable development
Angola	Preservation
Argentina	Appreciation, preservation
Australia	Sustain and improve (environmental sustainability)
Bahrain	Awareness and conservation
Barbados	Preservation, enhancement
Benin	Environmental education
Bhutan	Protection, conservation, safeguard, improvement
Bolivia	Protection, risk prevention, conservation, sustainable management
Cambodia	Awareness, protection, preservation
Central African Republic	Safeguard
Chile	Respect, rational use
Colombia	Conservation, protection, improvement
Croatia	Responsibility, sustainable development
Czech Republic	Knowledge, protection, sustainable growth
Djibouti	Protection, preservation
Dominica	Awareness, appreciation
Dominican Rep.	Protection, rational use, safeguard
Ecuador	Respect, sustainable environment
El Salvador	Protection, conservation, risk management, climate change, environmental sustainability
Eritrea	Respect, restoration, protection, knowledge, environmental sustainability
Estonia	Conservation
Fiji	Environmental sustainability
Gambia	Sustainable environment
Greece	Awareness
Grenada	Awareness, living in harmony
Guatemala	Knowledge, preservation, planned change
Guyana	Protection, care for
Honduras	Rational use, conservation, safeguard, protection, risk management
India	Protection
Iraq	Respect
Jamaica	Respect
Kenya	Appreciation, development, conservation
Kosovo	Responsibility
Lesotho	Conservation, maintenance
Lithuania	Sustainable development
Maldives	Knowledge, preservation
Mali	Protection (value)
Mexico	Protection, conservation, sustainable development
Moldova Rep.	Responsibility
Namibia	Respect, sustain
Nepal	Conservation, wise use
Nicaragua	Conservation, protection, improvement, rational use,

Niger	disaster prevention, sustainable development
Norway	Protection, preservation
Panama	Awareness, sustainable development
Paraguay	Knowledge, conservation
Peru	Protection
Romania	Awareness, respect, conservation, sustainable development
Rwanda	Respect
Serbia	Protection, sustainable development
	Awareness, protection, preservation, sustainable development
Slovakia	Protection, care for
Spain	Respect, sustainable development
St. Kitts and Nevis	Awareness, appreciation
St. Lucia	Awareness, appreciation
St. Vincent and the Grenadines	Awareness, appreciation
Sweden	Respect, care for
Tanzania, UR (Zanzibar)	Conservation, rational use
Thailand	Preservation
Tokelau	Knowledge, sustainable practices, sustainable development
Uruguay	Equitable sustainable development
Venezuela	Preservation, rational use, sustainable development
Zambia	Preservation

(Total number of cases = 64).

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ANNEX 1

In addition to information on the curriculum and related bibliography included in the seventh edition of [World Data on Education \(WDE, 2010/12\)](#), the following curriculum documents and other materials were further analysed:

Afghanistan	Curriculum Framework – Primary and Secondary Education (2003); Education Law (2008); Draft National Education Strategic Plan for Afghanistan 2010-2014 (March 2010)
Argentina	Website of the Federal Ministry of Education (August 2012)
Australia	National Curriculum (2010)
Belgium (Flemish Comm.)	Eurydice, <i>Organization of the education system in Belgium – Flemish Community</i> . European Commission, 2009/10 edition
Belgium (French Comm.)	Programme des études, enseignement fondamental (version 2009)
Bhutan	National Education Framework (version 2012)
Bolivia	Currículo base del sistema educativo plurinacional (2010); Ley de Educación (2010)
Botswana	Revised National Policy on Education, 10-year Basic Education Programme (1994)
Brazil	Diretrizes curriculares nacionais para o ensino fundamental de nove anos (CNE/CEB, Parecer nº 11/210 de 7 de julho 2010). Diretrizes curriculares nacionais gerais para a educação básica (CNE, Resolução nº 4 de 13 de julho 2010)
Brunei Darussalam	SPN 21 Curriculum (2009)
Burkina Faso	Rapport d'activités du secrétariat permanent de la Commission nationale des programmes du secondaire (2010)
Cambodia	Policy for Curriculum Development 2005-2009 (December 2004)
Canada (Alberta)	Framework for Student Learning: Competencies for Engaged Thinkers and Ethical Citizens with an Entrepreneurial Spirit (2011)
Canada (Manitoba)	Manitoba Education website (August 2012)
Canada (Québec)	Québec Education Program, approved version. Preschool and elementary education (2001; French version: 2006)
Canada (Saskatchewan)	2010 Saskatchewan Curricula. Renewed curricula: Understanding Outcomes (October 2010)
Cayman Islands	A new curriculum for schools in the Cayman Islands. Overview. Aims and guiding principles (January 2007)
Chile	Objetivos fundamentales y contenidos mínimos obligatorios de la educación básica y media (actualización 2009)
Cook Islands	Curriculum Framework (2002)
Costa Rica	Lineamientos emanados del Consejo Superior de Educación (2003)
Côte d'Ivoire	Curriculum de formation par compétences
Croatia	National Curriculum Framework (2010)
Czech Republic	Framework Education Programme for Elementary (Basic) Education (2007); Framework Education Programme for General Secondary Education (2007)
Dominica	National Curriculum Framework (2006); Education Act 1997
Dominican Rep.	Fundamentos del currículo, Tomo II: Naturaleza de las áreas y ejes transversales (2001)
Ecuador	Plan de estudios de la educación básica 2009 (preescolar, primaria y ciclo básico medio)

El Salvador	Currículo nacional de la educación básica
Estonia	National Curriculum for Basic Schools and National Curriculum for Upper Secondary Schools (2011)
Fiji	National Curriculum Framework (2007)
Finland	National Core Curriculum for Basic Education (2010 revision); National Core Curriculum for General Upper Secondary Education (2003)
France	Décret n° 2006-830 relatif au socle commun des connaissances et des compétences
Gambia	Curriculum Framework for Basic Education (grades 1-9) (draft, March 2010)
Germany	German EURYDICE Unit of the Federal Government in the Federal Ministry of Education and Research, <i>The Education System in the Federal Republic of Germany 2010/11. A description of the responsibilities, structures and developments in education policy for the exchange of information in Europe</i> , Bonn, 2011
Greece	Cross-thematic Curriculum Framework for Compulsory Education (2003)
Grenada	Curriculum Policy for Primary and Lower Secondary System (n.d.)
Guatemala	Currículo nacional base de la educación primaria, Currículo nacional base de la educación media – Ciclo básico (2010-11)
Honduras	Diseño curricular nacional para la educación básica (2003)
Hungary	National Core Curriculum (2003)
Iceland	National Curriculum Guide (revised 2007)
India	National Curriculum Framework 2005 (reprinted January 2010)
Indonesia	USAID Indonesia, <i>Competency-Based Education and Training Delivery: Status, Analysis and Recommendations</i> . November 2005 (analysis of 'Curriculum 2004' and Curriculum Guidelines 2003 and 2005)
Iraq	Iraqi Curriculum Framework (2012)
Ireland	National Council for Curriculum and Assessment, <i>Innovation and identity. Towards a framework for junior cycle</i> (2011)
Italy	(draft) National Guidelines for the curriculum of the pre-primary school and the first cycle of school education (primary and lower secondary) (2012)
Kenya	Report of the Task Force on the re-alignment of the education sector to the Constitution of Kenya 2010. Towards a globally competitive quality education for sustainable development (February 2012)
Kosovo	Curriculum Framework for Pre-university Education (2011)
Lesotho	Curriculum and Assessment Policy Framework (June 2008)
Lithuania	General Curriculum Framework (2008)
Luxembourg	Loi du 6 février 2009 portant organisation de l'enseignement fondamental
Malawi	National Curriculum and Assessment Framework for primary schools (February 2003)
Malaysia	Malaysia Education Blueprint 2013-2025. Preliminary Report – Executive Summary (September 2012)
Maldives	National Curriculum Framework (draft, 2011)
Malta	National Curriculum Framework (draft, April 2011)
Mauritius	National Curriculum Framework–Primary (January 2008); National Curriculum Framework–Secondary (November 2009)
Mexico	Plan de Estudios 2011. Educación Básica (2011); Lineamientos para

	el diseño de los programas de estudio correspondientes a la Asignatura Estatal de secundaria (2011)
Namibia	National Curriculum for Basic Education (2010)
Nepal	National Curriculum Framework (2005)
New Zealand	New Zealand Curriculum (2007)
Nicaragua	Nueva propuesta curricular (2007-2008)
Norway	National Curriculum for Knowledge Promotion (2006)
Panama	Programas de estudio de la educación básica general (versión actualizada, 2012)
Paraguay	Programas de estudio de la educación escolar básica (2008)
Peru	Diseño curricular nacional de educación básica regular (2008); Diseño curricular nacional de educación básica regular. Proceso de articulación (2005)
Philippines	K to 12 Basic Education Program (2012)
Poland	Core Curriculum for Preschool and General Education (2009)
Portugal	National Curriculum of Basic Education (2001)
Republic of Korea	Seventh Curriculum (2009 revision); Ananiadou & Claro (2009)
Romania	National Curriculum (Website of the Government of Romania, August 2012)
Samoa	National Curriculum Policy Framework (2006)
Seychelles	National Curriculum Framework (2001)
Singapore	New framework (2010)
Slovakia	Basic education curriculum (2008); Ananiadou & Claro (2009)
South Africa	National Curriculum Statement Grades R-12 (January 2012)
Spain	Enseñanzas mínimas (2006)
Switzerland (HARMOS-PER)	Accord intercantonal du 14 juin 2007 sur l'harmonisation de la scolarité obligatoire (concordat HarmoS) ; Plan d'études romand (PER) 2008 [being implemented since 2011 in 7 cantons: Bern, Fribourg, Geneva, Jura, Neuchâtel, Valais and Vaud]
Tanzania, UR (Mainland)	Secondary Education Curriculum for Tanzania Mainland (February 2005)
Tanzania, UR (Zanzibar)	Framework for the review, condensation and improvement of primary education curriculum (draft, 2009)
Thailand	Basic Education Core Curriculum (2008); Sirohi & Singh (2012)
Tokelau	National Curriculum Policy Framework 2006-2010 (March 2007)
Turkey	Ananiadou & Claro (2009)
UK (England)	Curriculum Framework (2008)
UK (N. Ireland)	Northern Ireland Curriculum Primary (2007); The Statutory Curriculum at Key Stage 3. Rationale and detail (2007)
UK (Scotland)	Curriculum for Excellence (2004); Experiences and Outcomes (2007-2009)
UK (Wales)	School Curriculum for Wales (implemented from September 2008); Skills Framework for 3 to 19-year-olds in Wales (2008); Education for Sustainable Development and Global Citizenship. Information for teacher trainees and new teachers in Wales (2008)
Uruguay	Ley de Educación de 2008
Venezuela	Currículo Nacional Bolivariano. Diseño Curricular del Sistema Educativo Bolivariano (2007)
Zambia	Basic School Curriculum Framework (2000)

Coding scheme: cross-curricular themes

Code	Notes	Excel dataset
CRC	Cross-curricular themes are/are not included	1 = included; empty cell = not included
ENV	Themes/topics related to environment are/are not contemplated	1 = included; empty cell = not included
TitENV	If a theme related to environment is present, its 'title/label' (either in English, French or Spanish)	Text
LevENV	The educational level considered	Text (primary, secondary, both primary and secondary or P, S, P+S)
OUT	Student learning outcomes related to environment are/are not specified	1 = specified; empty cell = not specified
OutENV	If learning outcomes related to environment are specified, they are reported (either in English, French or Spanish)	Text
PRO	The way in which the theme related to environment should be taught is/is not specified	1 = specified; empty cell = not specified
ProENV	If the kind of provision is specified, this will be reported (either in English, French or Spanish)	Text
ProEMP	If the theme related to environment emphasizes on activities in real-world context, this will be reported (either in English, French or Spanish)	Text
ProTEA	If there are references to the kind of teacher skills for teaching environmental themes, this will be reported (either in English, French or Spanish)	Text
EVA	If learning outcomes related to environment are specified, recommendations on how they are to be assessed are/are not provided	1 = provided; empty cell = not provided
EvaENV	If there is a reference to the kind of assessment envisaged, this will be reported (either in English, French or Spanish)	Text

Coding scheme: general competences/skills

Code	Skill/competence	Notes
COM	Communication	Includes “communication skills” and also “communication in the mother tongue”, “communication in foreign languages”
LIT	Literacy	Includes also “literacies”, “developing literacies”
NUM	Numeracy	
LRN	Learning to learn	
PRO	Problem solving	
CTH	Critical thinking	Includes also “critical and creative thinking”
CRE	Creativity	Includes also “creativity and innovation”, “innovation”
COL	Collaboration	Collapsed category combining “collaboration” and “teamwork”
SCT	Basic competences in science and technology	Includes also “mathematical competence and basic competences in science and technology”
ICT	Digital competence	Includes also “ICT competence”, “digital and technological fluency/competence”
INF	Information processing and enquiry skills	Collapsed category: a combination of information processing (use, select and process information) and enquiry skills (investigation, research)
ETR	Entrepreneurship	Includes also “sense of initiative taking and entrepreneurship”, “initiative”, “competitive skills”
ENV	Environmental awareness/responsibility	Includes also “learning for sustainable development”, “social, cultural, global and environmental responsibility” “knowing the natural environment” (the latter with emphasis on understanding of, interaction with and changes occurring in the natural environment)
SOC	Social competence	Includes also “personal and social competence”
CIV	Civic competence	Includes “civic competence”, “citizenship”, “social and civic competence”

Coding scheme: aims

Code	Notes
ENV	Environmental and/or sustainability issues are explicitly mentioned among the general aims and goals of education (code = 1; an empty cell means that no reference was found). The statement is recorded in either English, French or Spanish
DEV	There is a reference to the contribution to ‘development’ (code = 1; an empty cell means that no reference was found). The statement is recorded in either English, French or Spanish