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Education for Sustainable Development through Geography in Romanian Secondary Schools: A Curriculum Insights

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ABSTRACT: Education for sustainable development (ESD) in schools is a key element added in recent years to the objectives of educational systems through disciplines, targeted to enable students for sustainable development. In this regard, the present paper aims to reveal the ESD purposes of Geography curricula in Romanian secondary schools. It is based on qualitative analysis of the official and research documents. The results highlighted that Geography, as a subject, is appropriate to the sustainability theme, but explicitly the concept is clearly formulated at 8th, 10th, 11th and 12th grades. In all grades, the geography curricula contents refer to different aspects which are linked to 2030 Sustainable Development Goals of United Nation (2030 SGDs-UN). The current geography school curricula stipulate the specific competencies that must be formed at each level of education, involving almost all of Global (UNESCO) or European Union's ESD key competences (GreenComp) even if they are not explicitly formulated in these documents. Also, some competencies are related to the contents of the programs and can be seen as a good basis for their implementation, but many of them depends on teachers' specific pedagogical practices, and professional readiness concerning ESD. That's why, Geography curricula need to be update in consensus with ESD policy, and teachers needs specific training for sustainability competences, in near future.

KEYWORDS: Geography curricula, Global ESD competences, Sustainable development, Romania, secondary education

1.Introduction

Education for sustainable development (ESD) gained attention in recent research. Some of them included ESD through geography in secondary schooling (Martínez-Hernández & Mínguez, 2023; Sakaue et al., 2024; Howard-Jones & Hennessy, 2025). However, ESD research remains scattered and does not provide coherent directions (Redman and Wiek, 2021). In this regard, a study about the Geography role for teaching sustainable development (SD) and ESD in Romanian education system may fill some gaps in regional outputs.

Geography refers to the Anthropocene changes (Crutzen, 2002) due to human activity impacts on the Earth seen in resource depletion, loss of biodiversity, climate change, etc., but, also it focuses on humankind attempts to equilibrate economy, society and environment by sustainable development (SD). The sustainable development is a philosophical concept of the last five decades, an integral process of nowadays society, for which, ESD is considered a driving force (Kioupi & Voulvoulis, 2022; Rodrigues da Rocha et al., 2022). ESD was set up globally (GESD), through the United Nations 2030

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Agenda, for Sustainable Development Goals (2030 ASDGs), and UNESCO Roadmap for 2030 serve as framework to equip individuals with the knowledge, skills, and values necessary to address pressing environmental, social, and economic high-priority issues (UNGA, 2015, UNESCO, 2020). In Europe, Council of Europe (CEU) set up a guide for ESD key competences under the name "GreenComp" (CEU, 2022; Bianchi et al., 2022). In this framework, the school curricula are called upon to integrate sustainability-related competences, fostering knowledge, civic responsibility and adaptability for both life and professions that have yet to emerge (OECD, 2018). All curricula disciplines can become ESD promoters (Arsan & Curle, 2024), including Geography, which, as both an academic integrative discipline and a school subject, occupies a unique position in this process (Meadows, 2020). It develops not only spatial and environmental literacy but, also, provides the conceptual frameworks needed to understand the interconnections between human societies and natural systems. This disciplinary specificity positions Geography as a potential leader in advancing sustainability-oriented education (Widener et al., 2016), particularly by linking local realities with global sustainability imperatives.

In 2015, Romania, like other 192 countries adopted the 2030 Agenda for Sustainable Development, with the 17 sustainable Development Goals (SDGs) within its core, implicitly the 4th Goal-4.7.1 objective for ESD, aligning its national education policies and curricula with the global sustainability agenda through its national educational roadmap 2030 (ME, 2023). However, the reality of educational systems varies over nations, being not fully known, and hence research, debates on the ESD issues, aiming to comprehensive understanding of its functioning, the degree to which these objectives are internalized and operationalized within the geography curriculum. Thus, this study highlights the current state of Romanian Geography Curricula in secondary schools through from the perspectives of UNESCO's ESD framework and the CEU "GreenComp" key competences, including their various dimensions. The study pursued three research objectives:

1.To investigate SD knowledge through Geography conveyed through its contents in the secondary education system;

2. To identify SDGs (UN 2030) that are linked to Geography curriculum content;

3.To examine the integration of ESD (UNESCO) and "GreenComp"(CEU) competences within Geography curricula.

2. Theoretical and historical foundations of education for sustainable development including Geography

2.1. Environmental education - the early stage of ESD

The concept of sustainable development came into general attention in the seventh to eighth decades of 20 Century, tided to the UN Conference from Stockholm (1972) and more precisely with Brundtsland Report, 1987 (WCED, 1987). Simultaneously, in many developed countries, the educational systems started to implement environmental education (EE), a term promoted previously by Pritchard (1968), which referred to the human correct attitude for the environment to conserve and use it with wisdom. Thus, Sweden, US, Australia, UK, Japan etc. integrated environmental education into Geography (alongside Science) applying it under the umbrella of that time definition of UNEP (1970), which considered EE as a process employed to learn, understand, and appreciate the values between the environment and humanity able to "entails practice in decision-making and self-formulation of a code of behaviour, about issues concerning environmental quality". In detail, Sweden introduced EE almost synchronic with The Stockholm Conference (1972) (Forselius, 1972) in Geography and Natural Science subjects for all grade together with teachers training for. Also, educational instructions in many states of US focused on environmental programs for students, where, teachers "must become the provider of experiences" (Brennan, 1972) for

understanding the interdisciplinary of the nature and human issues, called, later, the total education for the total environment-TETE (Brennan, 1974). Australia, taking examples of aboriginal culture for nature conservation, subscribed officially to consider the EE for schools in 1970 (Stevenson & Evans, 2011). An important event which boosted EE in schools was the UNESCO–IUCN Conference in Tbilisi (1977), when the "Tbilisi Declaration" stated that the EE emphasized awareness, knowledge, attitudes, skills, and participation in solving environmental problems (UNESCO-UNEP, 1987). After this important event, United Kingdom, which has risen the questions about environment pollution since the 18th Century, introduced EE in curricula as cross-theme in secondary schools (1989) and reconsidered it, recently, 2022, through ESD (Rushton & Walshe, 2025). Also, in the 1980s–1990s, Japan applied EE through integrated subjects, but Geography (part of Social Studies) was a key context for teaching about pollution, population, urbanisation, land, and environment (Nomura, 2017). In this stage, EE evolved beyond nature/ecology to include economic and social dimensions.

In Romania, during the communist period (1945-1990), the population exhibited a low level of environmental awareness (Dorondel, 2019). From around 1980, the EE was introduced through environmental geography curriculum taught at the 11th grade. This was structured on one levels: first, by theoretical geographical concepts, and second, by environmental issues, with a focus on risk phenomena and hazards. However, environmental education through geography remained limited to knowledge-based competences.

2.2.ESD transition and pre-institutionalization

At the end of the 20 Century, after the UN Conference on Environment and Development (UN, Rio, 1992), the EE evolved beyond ecology knowledge and conservation and started to include economic and social issues. The "Agenda 21", Chapter 36, highlighted that the education is essential for sustainability and called for a reorientation of education towards sustainable development (UN, 1992). In the same year, the International Geographers Union set up the geography enrolment in ESD (IGU, 1992). The period 1992-2000 may be considered the transition phase of EE to ESD.

It was followed by the Decade for ESD (2005-2014) which became globally a need in education, and, when, many countries embarked on inclusion of ESD in schools` curricula. Thus, many UNESCO member states endorsed the Decade, but not all implemented it systematically. Success was reported for European countries, which developed a scheme for ESD competences in schools (UNECE, 2005). Also, the IGU (2007), in "Lucerne Declaration"I ncreased the power of Geography in ESD, completing, competences needed, criteria for curricula, and Information and Communication Technologies (ICT). The issues of curriculum reform and the whole-school approaches became research subjects for Sweden, where ESD were introduced officially in upper secondary schools with trained teachers tutors of different disciplines and a large freedom of choosing the forms of education. Starting with 2000, four curriculum subjects in England, including first geography followed by science, design and technology, and citizenship, were established formally by the Govern to deal with ESD (Firth and Smith, 2013). United Kingdom signed up a strategy focused on achieving the Millennium Development Goals 2015 of UN for this decade since 2005, leaving countries autonomy to implement it. Thus, many forms of applying ESD have been developed in schools for students aged 11–19, through formal and informal activities, leaded by teachers and other stakeholders, many of whom work within the Eco-Schools Program (Higgins et al., 2013). Complex achievements were also in Japan, where the ESD was structured implemented in 2008 by supervising and revising of National Programs for all levels of schools by Govern (Fredriksson et al., 2020). Thus, Japan created a strong educational process to endorsed skills for teachers by the higher education institutions, including geography, and, also in primary and secondary schools (Sakaue et al., 2024). US were among the

states that partially implemented ESD. The government, instead of a federally adopted "Decade" strategy, approached some initiatives among states, local, and non-governmental initiatives for ESD (Glavič, 2020). But not many countries absorbed ESD. A weak, sometimes absent implementation of ESD Decade was specific in fragile states (Romania), or those with difficult contexts of conflicts (Afganistan, Irak etc.) (UNESCO, 2017). Research and literature explored the subject on many aspects like the preparedness of teacher for teaching SD and ESD on various areas. Planinč (2008) revealed some teachers education needs and issues in South, Eastern Europe. Benimmas, Kerski, and Solís, (2011) studied the issue in Middle East and Northern Africa (MENA) on educational staffs and found that a focused on GIS–SD professional development institute significantly strengthened MENA teachers' geotechnology skills and shifted their pedagogical vision toward integrated, locally grounded, sustainability-oriented geography education. Ozel et al., (2013) underlined that Turkish prospective geography teachers showed important shortcomings in awareness and understanding of sustainable development, and called for improvements in teacher training to address these gaps.

The analysed period for Romania overlapped with radical changes in the political system, when communism collapsed and the country turned into democracy. At first, shaken by these changes, the educational system experienced small changes, although the need for reform was emphasized. In the period 1995-2000 a new National Curriculum was set up (Marga, 1998), but the only benefit was the introduction of the Ecology subject at the gymnasium level (grade 8). Following the National Curriculum (1998), the educational programs were focussed on the development of knowledge, skills, attitude and value, keeping some contains of Geography, History, Biology, Chemistry tied to the SD. Even Romania adopted the UNECE Strategy for Education for Sustainable Development in the Vilnius meeting, (2005) as part of the UN Decade of ESD, given other economic-social and political priorities, and the process of joining the EU (2007) almost nothing was done in the national curricula (Dumitru & Stoenescu, 2011). One of usefulness was the changing of contents for Geography, 11th grade (OME, 3252, 2006) by the inclusion of sustainable development theme. Thus, Romania curricula for secondary schools maintained the knowledge acquisition rather than values, action or building competences (Bagoly-Simó, 2014).

2.3. Global Frameworks and Recent Developments of Institutionalized ESD

The Sustainable Development Goals (SDGs) for 2015-2030, adopted in the 2015 include Goal 4, Target 4.7, which calls for education to foster sustainable development, human rights, gender equality, peace, and global citizenship. It emphasizes transformative action, systemic change, and responsibility toward future generations (UNESCO, 2020) to fulfil seven competences: systems thinking, anticipatory, normative, strategic, collaborative, critical thinking, self-awareness, and integrated problem-solving. In response, educational systems worldwide have revised curricula and policies to integrate ESD, a required learning outcome, and a key enabler for all SDGs to equip learners with skills and values to act sustainably, generating unprecedented momentum in both national educational institutions and research. In 2025, United Nations Economic Commission for Europe (UNECE) summarized for the fifth phase of ESD assessment in Europe that national education policies implementation is strong in the region, with a high rate in national curriculum frameworks from primary to upper secondary education, but teacher training and student assessment frameworks, however, remain only partially aligned with ESD (UNECE, 2025). According to the UNESCO, Berlin Report (2023) many similarities with the UNECE countries were found globally, that why, finally it iterated the need for support teachers, educators or youth engagement, by "developing adequate learning assessment of ESD".

Current scholarship highlights diverse approaches to ESD for this period. Many of them refer to the higher education, including discipline-specific teaching, such as Geography (Martínez-

Hernández & Mínguez, 2023), interdisciplinary (Mokski et al., 2022) preparing future specialists capable of advancing sustainable development across various fields (Fiselier, Longhurst, & Gough, 2018; Acosta Castellanos & Queiruga-Dios, 2022). Other studies have examined ESD themes in secondary education, such as climate change education (Monroe et al., 2019; Howard-Jones & Hennessy, 2025), education for global citizenship (Santamaria-Cardaba et al., 2024), and sustainability competences, including critical thinking, problem solving, and collaboration (Shephard et al., 2015; Cebrián, Junyent, & Mulà, 2020). Despite this wealth of research, Redman and Wiek (2021) noted that these studies "remain dispersed and thus do not offer coherent direction."

Geography as provider of ESD in secondary school was a subject of regional research. Studies conducted in Republic of South Africa (RAS) (Dube, 2017) or Vietnam (Nguyen, 2019) attracted attention on ESD in Geography issues: the lack of SD knowledge, pedagogical methods of teachers in a landscape of schools` constraints of RAS, orientation to produce knowledge and indoctrination rather than competences (Vietnam). Opposite to these, analysis in the contents of geography curricula revealed the extraordinary role of geography in US or China in cultivating learners' cognition and ability regarding sustainable development (Miao, et al., 2022). The topic of ESD skills within Geography education exhibits less research interest. Structured by UNESCO (2017) and the Council of the European Union (2022), probably few countries apply them. Among European states, the results of Schönstein & Budke's (2024) research showed that in German secondary schools, although they demonstrate well-structured and coherent approaches, implementation is subjective, depending on the background of each teacher.

Since 2015, Romania, as an adopter of Agenda 2030, has made notable progress in bringing ESD into secondary education: through policy adoption, curricular reforms, pilot programmes, and infrastructure development. Today, a more coherent framework exists - encompassing national strategy, cross-curricular initiatives, and school-level programmes - that was previously less developed (Ministry of Education, 2023). Nevertheless, significant challenges remains to fully embed ESD, including: teacher training, consistent implementation, and monitoring outcomes (Chiriac & Iaţu, 2023), as well as ensuring that all schools, particularly those in disadvantaged or remote areas, can participate meaningfully.

3. Methodology of research

The content analysis method was applied in two steps, both involving manual processing of texts. The first step, conceptual analysis, aimed to identify the main themes in documents by examining the occurrence and frequency of the following terms: sustainable development, environment protection, environmental issue. The second step employed thematic analysis to uncover ideas related to core ESD competences and the UN 2030 SDGs by identifying patterns of meaning. Together, these steps represent a combined quantitative and qualitative approach to content analysis (Krippendorff, 2013).

4. Results and discussions

4.1. Basic landmarks of geography teaching in Romania

In Romania, secondary education refers to lower secondary schools for grades 5–8, and upper secondary units for grades 9–12/13, but between 0 - 10 grades are mandatory (Law 198/2023). In Romania, statistics for 2023 showed the existence of 3,892 primary and lower secondary schools, and 1,469 high schools for upper secondary education (NIS, 2024). These units employed almost a quarter million of (245,039) teachers across all educational levels (NIS, 2024). Of these, Geography/Geology accounts for almost 2% full-time positions distributed mostly in urban area (65.4%) (ME, 2023). Notably, 84.6% of Geography positions are filled by fully qualified teachers,

exceeding the national average of 80.3%. According to the education act (Law 198/2023), after graduating a faculty, geographers, like other teachers have the right to professional development, through teaching degrees, and official training and career development programs. Even though these are not mandatory, the teaching career is based on completing them. Thus, at least theoretically, teachers are continuously enabled to adapt and improve their teaching skills, some being in line with the changes and challenges of the society in the context of SD. By educational policies and legislation, secondary education in Romania is part of the National Curriculum (Law 198/2023). National Curriculum comprises regulatory documents, periodically revised: the framework plans and discipline curricula. The educational framework plans structure the mandatory subjects in the common core curriculum (CC) represents the centrally established educational offer, which students are required to complete it according to their level of schooling, year of study, educational track, profile, and specialization. The CC ensures equal access to education for all students. The differentiated curriculum (DC) refers to the centrally established educational offer that all students must follow according to their profiles and specializations/qualifications. The DC consists of a set of subjects or modules with corresponding time allocations, differentiated by profiles and specializations/qualifications. The school-based curriculum (SBC) and the locally developed curriculum (LDC) represent the educational offer proposed by the school, in accordance with the learning needs and interests of the students, the school's specific characteristics, and the needs of the local stakeholders.

In the framework plan, Geography, which is part of the common core, is allocated between one hour per week and, two hours/week only in a few key grades. In the lower secondary "Man and Society" area, geography has one hour/week (about 36 hours/year), and 2 hours/week only in grade 8. High-school geography curricula adopted in 2004–2006 also work within a tight weekly budget, typically 1–2 hours/week depending on track/profile. Teachers and researchers repeatedly criticized that one hour/week (and two in 8th grade) is insufficient for the breadth of content and skills expected (Pascal, 2025; Dulamă el al., 2017). The disciplines curricula expose competences, themes or units, learning activities and other teaching details. School curricula, organized by subject, are the official documents that serve as the basis for creating textbooks for students, in both print and digital formats, through a national competition organized by the Ministry of Education.

4.2. Geography contents with SD information and ESD values

The structure of Geography curriculum on force comprised: Earth Geography (5 grades), human and regional geographies (6,7 grades), more specific "Terra-Basic Human Geography-Europe", and "Geography of non-European continents", Physical Geography (grade 9), Human Geography (10 grade), Fundamental issues of humankind (11 grade) and particularly, Romania and Europe Geography (12 Grade) (Tables 1, 2). Geography teaching from 5th to 8th grades functions on the syllabus set up in 2017 (OME, 2017). In the high schools, education geography is still based on two curricula (2004; 2006)(Jucu, 2012). It was only in 2025 that Framework Plans (MO no. 4350/2025) and debating on the curricula for high schools were drawn up, with implementation scheduled for 2026 for grade 9. Consequently, by 2028, geography courses taught under the old curricula will be fully phased out. The content provided in Geography curricula is generally aligned with the concept of SD and the UN SDGs in lower secondary education, and even more closely in upper secondary education. However, with respect to SD itself, which appears three times across all units in the 8th-grade curriculum, the concept is not explicitly framed in lower secondary education. In grade 8, SD is mentioned only in the last unit, titled "Environment," where elements of SD are linked primarily to resources and population. Although students study various environmental, societal, and economic issues (Table 1), there is no official reference to the need to teach the SD concept explicitly.

Table 1. Targeted 2030 SDGs and UNESCO ESD key competences by contents of Geography Curriculum for grades 5th to 8th, Romania (OME no. 3.393/28.02.2017)

K	Units	Contents	ESD key comp.	Main targeted SDGs
5	Earth – a planet in transformation	*Practical application for every Earth 'component at local space*: protection (conservation) measures, warning methods, rules &protective measures in the extreme event	Anticipatory Critical thinking Action Normative	13 (Climate Action), 6 (Clean water and sanitation), 14 (Life below water), 15 (Life on Land)
	Earth natural areas	Diversity of terrestrial natural landscapes	System thinking Critical thinking	13 (Climate Action), 15 (Life on Land)
6	Anthroposphere - man and human activities	Population, settlements, natural resources, economy Effects of human activities on the environment and quality of life *Practical application*. Local challenges in a global context	System thinking Critical thinking Responsibility & action Normative	2 (Zero Hunger), 3 (Good health & well-being), 6 (Clean water &sanitation), 11 (Sustain. cities), 12 (Responsible consumpt.), 13 (Climate Action)
	Europe – geographical identity	The natural environment as a support for human habitation People and places Economy, EU Countries	System thinking	11 (Sustainable cities), 13 (Climate Action), 9 (Industry, infrastruct.), 17-Partnerships -17.E)
	Europe in contemp. world	European cultural and human values Quality of life in Europe	System thinking	3 (Good health & well-being), 10 (Reduce Inequalities)
7	Africa, Asia, America	Asia-Biogeographic, regional economic contrasts;. Africa's issues in the contemporary world. Sahara; America-territorial contrast among countries. Urban agglomerations. Regional economic differentiations. Australian biogeographic uniqueness	Critical thinking	1 (No poverty), 2 (Zero hunger, 2.1-2.4), 13 (Climate Action), 15 (Life on land), 11 (Sustainable Cities), 9 (Industry, infrastructure), 12 (Responsible consump.)
	Elements of environ. geography	Components of the environment and the relationships between them. Environmental degradation, a problem of the contemporary world. Global environmental changes	System thinking	13 (Climate Action), S15 (Life on land), S12 (Responsible consumpt.), 6 (Clean water & sanitation)
8	Relief	Applications for resilience to land risks, earthquakes etc.	Action, self-aware, anticipation	3 (Good health and well-being).
	Climate-waters-plants- fauna-soils	Practical applications: Rules of behaviour during climatic, hydrographic, biogeographical risks	Self-aware	13 (Climate Action), 3 (Good health and well-being).
	Economy	Applic./case studies: Capitalization of alternative energy resources	Critical thinking	7 (Affordable and clean energy)
	Environ.	Environmental quality in Romania. Recent developments. Resources, population and elements of SD	Critical thinking	All SGDS
	Romania in Europe /world	Natural and cultural values of Romania, Romania as a member of the UN, NATO and the EU	Normative	15 (Life on land), 16 (Peace, justice and strong institution)

Table 2. Targeted 2030 SDGs and UNESCO's ESD competences in the contents of current Geography Curricula for grades 9th to 12th, in Romania

K	Units	Key contents	ESD key comp.	Targeted SDGs
9	Relief	Relief and society. Local horizon relief	Critical thinking Anticipatory	6,11,12,13,15
	Climate	Climate and society. Local horizon climate	Critical thinking Anticipatory	13
	Hydrography	Waters and society. Local horizon waters	Action, Normative	6
	Vegetation, fauna and soils	Vegetation, fauna, soils and society. Local horizon application	Anticipatory	14, 15
	Environment, landscape and society	Interactions between natural elements of the environment. Interactions between humans and the terrestrial environment	System thinking	4,5,13, 14, 15
	Political geography	Current issues of political geography	Critical thinking	16, 17
10	Population and human settlements	Urbanization issues, migration, social development. Population, environmental protection and SD	System thinking	1, 11 All SDGs
	World economy	Resource exploitation, energy industry	Critical thinking Problem-solving	12, 7
11	Environment - the main issue of the contemporary world	Natural and anthropogenic hazards Deforestation, desertification and pollution –effects of human activities on the environment; *Scenarios about the evolution of the environment; Protection, conservation and safeguarding of the environment; Environmental management	All ESD key competences	4,5,13, 14, 15
	Population, natural resources and development of contemporary world.	Population, resources and world development; SD	All ESD key competences	1,2,3,4, 7, 11
12	Geography of Europe and Romania	Environmental problems in Europe and Romania, environmental protection policies	System thinking Self-aware	11, 13,15
	Geography of Romania	Europe, the European Union and Romania in the process of evolution of the contemporary world in the coming decades	Critical thinking Normative Self-aware	7, 11, 12

Source: National Geography Curriculum for Higher Secondary Education (Grades 9–10), approved by Order of Minister of Education, Order (OME no. 3458/09.03.2004), Annex 2 to the Order of the Minister of Education (OME No. 3252/ 13.02.2006) (Grade 11 and 12). Methodological benchmarks (2021-2024) Notes: contents with * are included in CD; K-acronym for grade

In lyceum, Geography gradually increase the concept of SD, starting with the 10th grade with the unit "Population, environmental protection and sustainable development", continuing in the 11th grade with a more complex approach in the almost entire content, and finalizing in 12 th grade by national perspective in the unit "Romania, sustainable resource management, environmental protection, regional development" (Table 2). The contents addresses topics encompassed by the UN SDGs, 2030, although it is not explicitly designed to cover them to cover. The Geography Curriculum

themes with the highest occurrence are: environmental protection (SDGs: 6, 7, 12, 13, 14, 15), natural resource management (SDG 12), spatial and social inequalities (SDG 10), sustainable urbanization (SDG 11), natural hazards and their impacts on communities (SDGs 1, 3, 11, 13, 15) etc. Among the 17 objectives, the most frequently targeted are: "Climate action" (SDG 13), "Sustainable cities" (SDG 11), "Clean water & sanitation" (SDG 6), "Life on land" (SDG 15) (Tables 1, 2).

Some themes are linked to the UN sub-goals. This is the case of grade 6, "EU Countries" units for 17 SDG (Partnerships for the Goals), respectively 17.E (Enhance policy coherence for sustainable development) and in 7 grade, for Africa, Asia themes which link to SGD2 "Zero hunger", both 2.1. "end hunger..," and 2.4.... "sustainable agriculture". Moreover, the practical applications or case studies provided for in the programs are and must be based on global or regional data which are structured according to the indicators established on the SDGs, delivered officially as open sources.

4.3. ESD competences through Geography

In Romania, Geography, as a part of the National Curriculum disciplines, contributes to the competences` development, according to the European education standards. These competences provide a framework for personal fulfilment, employability, social inclusion, sustainable lifestyles, active citizenship, and health-conscious living (EUC, 2018) and are developed in a lifelong learning perspective, encompassing formal, non-formal, and informal contexts, including family, school, and the workplace. Thus, EU revised the eight key competences of 2006, in 2018 harmonized with SDG 4, stressing the roles of literacy and multilingual skills; digital competence, entrepreneurial, "personal, social and learning to learn"; citizenship; STEM, keeping also "cultural awareness and expression" (CEU, 2018). Key competences are intended to be developed across the entire education system. Building on these, each discipline incorporate general competences for each discipline, which are further specified into subject-specific competences (Matei, 2020).

ESD competences, either of UNESCO (Figure 1) or EU (GreenComp) (Figure 2) are not exposed properly in any curricula of geography for secondary schools. But formulation of geography contents with their specific competences, activities implicitly are tied with the ESD competences (Table 2).

UNESCO defined three domains for competence regarding: knowledge, which comprises theoretical background calling for thinking skills, social-emotional dimension reflecting attitude, values, and behaviour as action skills (Rieckmann, 2018).

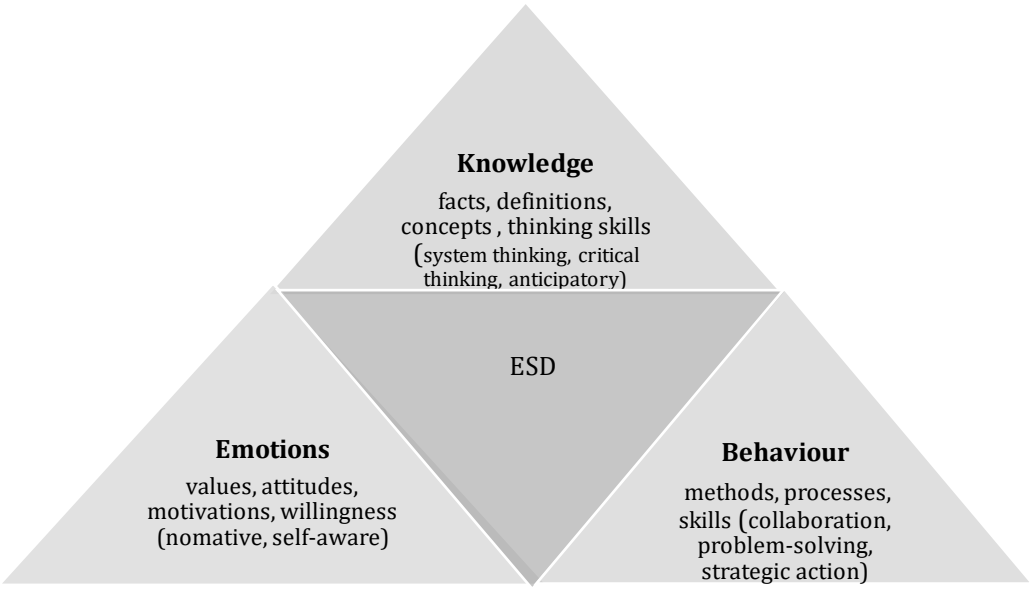

Figure 1. UNESCO key ESD competences by domains. Processed after Rieckmann (2018).

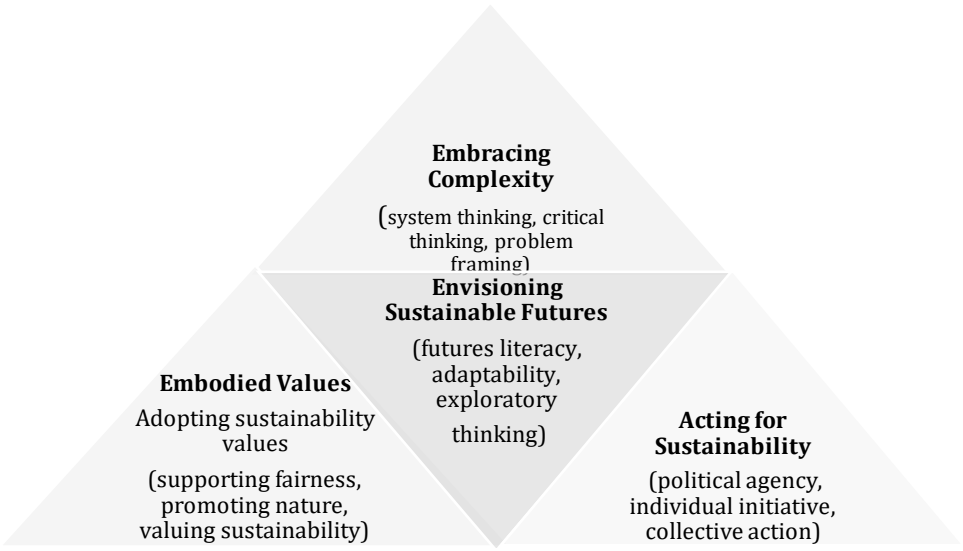

Figure 2. GreenComp scheme. Processing after Bianchi, G., Pisiotis, U., Cabrera Giraldez, M. (2022).

CEU (2022) developed a comprehensive grid of ESD competences, adapted to the realities of the different countries and organised into four areas (domains), each comprising three competences (Figure 2). This framework emerged from the need for a cross-disciplinary approach to SD and to support its effective operationalization beginning at the secondary education level (Stouthart, Bayram, & van der Veen, 2025).

In Bianchi et al.'s (2022) conceptualization of GreenComp, the first cluster of "Embracing complexity" comprises three competences (Figure 2), two correspond to the UNESCO "Knowledge" domain.

Systemic thinking competence has its roots in Bertalanffy's Theory of General System, developed in the mid of 20th Century (Assche, Valentinov & Verschraegen, 2019). It refers to an individual's capacity to perceive a system holistically by recognizing relationships, interconnections, and dynamics, thereby enabling decision-making based on this complex understanding. ST is applicable to any system characterized by complex interdependencies such as Earth's natural components or interactions between natural environment and societies or/and economies. It involves analysis on long-term dynamics to anticipate the consequences of interactions within evolving systems-characterized by the periods of equilibrium, amplification or decline-and to understand synergistic and compounded effects.

Critical thinking competence is defined in various ways by researchers. It is widely regarded to be crucial for people's skills in the 21st Century (Scott, 2015), and a higher order form of thinking which enables learners to reason correctly, coherently, logically, based on sound arguments (Matei, 2020). Golden (2023) defined it as" purposeful, self-regulated judgment based on analysis, evaluation, inference, and explanation using evidence, concepts, methods, criteria, or context". This competence supports individuals in making well-informed decisions while maintaining an open-minded attitude. In relation with this competence, pedagogy has developed meaningful student-centred, interactive methods, such as brainstorming. Consequently, any SD, any SD contents within Geography curricula can be used to foster critical thinking, depending largely on teachers' pedagogical orientation and their preference for interactive instructional strategies.

Problem framing competence is a process frequently used across different domains. It refers to the development of cognitive-operative skills, particularly those involved in identifying and sequencing appropriate steps to ensure long-term viability of solutions (Sadaf & Motoharu, 2023). Framing a problem means clearly defining it (what is it?), analyzing its causes (why does it exist?),

reframing perspectives from relevant viewpoints (for whom?), and reaching agreement among stakeholders or beneficiaries in order to formulate appropriate solution(s). This competence can also be reached through the procedural strategies applied by teachers when addressing SD contents (Tables 1, 2)

Adopting sustainability values, or "*Embodied values*", is the cluster that encompasses attitudes or internalized aspects of equity, protecting nature and valuing sustainability (Figure 2). These competences are well aligned with SD topics in Geography curricula. Their achievement could be linked with specific classroom activities, project-based learning, fieldwork and other experiential teaching approaches.

Supporting fairness competence, in education, involves ensuring equity among individuals by providing appropriate support for personal fulfilment. As a competence, it encompasses respect for shared values, the promoting of principle of equitable treatments, and the application of of justice in decision-making (Burns, Koester, & Fuster, 2016).

Promoting nature competence recognizes the intrinsic and instrumental values of nature and is directly linked to the adoption of actions aimed at protecting and enhancing ecosystems and biodiversity. It supports understanding the importance of maintaining a fair and balanced relationship between humans and nature.

Valuing sustainability is grounded in acknowledging the importance of sound environmental, social, and economic management for the well-being of both present and future generations.

The *"Envisioning Sustainable Futures"* cluster focuses on anticipation and the development of future-oriented visions. It involves creative thinking and emphasizes the importance of resilience in addressing sustainability challenges. It comprises three competences. *Futures literacy competence* is a construct rooted in Miller's views (2018), which emphasizes the idea that human can transform predictions into reality though their ability to explore possible futures, anticipate change, develop responsible scenarios, strengthen resilience and promote sustainability. *Adaptability competence* stimulates building the ability to respond constructively and flexibly to change. Otherwise, Garmezy (1991) defined resilience theory as the "capacity to recover and maintain an adaptive behaviour after a negative event". *Exploratory thinking* competence relates to systems thinking and problem framing; however , it is more specifically defined as an open-ended process of inquiry aimed at exploring uncertainty and identifying new possibilities.

"*Acting for Sustainability*" is situated within UNESCO's behavioural domain, through its key competences differ. In GreenComp it emphasizes political agency, individual initiative, and collective action. *Political agency competence* refers to students` capacity as future citizens to act politically, and to understand their role in decision-making processes that shape the institutional dimension of SD from social, to environmental outcomes. It is about awareness, active participation, and a sense of responsibility. Through *individual initiative* competence, students develop the ability for acting proactively in consensus with ethical intentions, taking responsibilities for their actions, and making decisions initiatives based on their own values, judgment, and reasoning. *Collective action* emphasizes the importance of working collaboratively in teams toward a shared goal, idea, or objective, particularly in addressing common SD challenges. These competences can be fostered through teachers' instructional strategies, including classroom activities and project-based learning.

In summary, although specialized literature on SD is available online and in school libraries, and programs such as the Green Week of the Ministry of Education (since 2023) exist, ESD key competences are not explicitly integrated into the general or specific competencies of current curricula. Nevertheless, secondary schools can still foster these competences through selected geography content and appropriate teaching methods, thereby providing meaningful educational benefits.

Conclusion

The study explored how Geography curricula within Romanian secondary education foster ESD competences. Using a combination of qualitative and quantitative methods, aligned with an empirical approach, the study applied content analysis to address the three proposed research objectives.

For the first objective, which aimed to investigate SD knowledge within geography content in the secondary education system, the results revealed that curricula for lower secondary grades incorporate a range of topics on environmental, economic, and societal issues, but without explicitly addressing the concept of sustainable development. SD is introduced starting in grade 8 and continues through lyceum grades, with the exception of grade 9. At these levels, the curricula promote sustainability-related topics, explicitly emphasizing values such as care for nature and sustainable practices.

Regarding the second objective, which focused on identifying links between the Geography curriculum and the UN 2030 Sustainable Development Goals (SDGs), the analysis showed that from lower secondary (grades 5–8) through upper secondary (grades 9–12), the Romanian geography curriculum aligns with all SDGs. The most frequently addressed goals were Climate Action (SDG 13), followed by Sustainable Cities (SDG 11), Clean Water and Sanitation (SDG 6), among others. In some cases, curriculum content was linked to specific SDG indicators.

The third objective examined the transposition of global ESD competences (UNESCO) and CEU GreenComp competences into the Geography curricula. Findings indicate that learning outcomes align with both frameworks in terms of critical thinking, systems thinking, values, anticipation, and acting for sustainability.

Overall, the study highlights the need to continue research on geography teachers' preparedness to develop ESD competences and underscores the importance of updating curricula to include more specific general and subject-specific competences, explicitly addressing ESD.

Further research will extend this approach by investigating Romanian geography teachers' perspectives on their training needs for ESD. Additionally, it will explore students' feedback on the knowledge and skills they have acquired following the introduction of the Ministry of Education's "Green Week" program dedicated to education for sustainable development.

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