

# SUSTAINABILITY IN GEOGRAPHICAL EDUCATION

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The Sustainability in Geography Education study focuses on a quantitative and qualitative analysis of sustainability learning tasks in a sample of geography teaching materials for primary and secondary schools. The quantitative analysis shows that the proportion of learning tasks following the principle of sustainability is higher in secondary school teaching materials compared to primary school teaching materials. The qualitative analysis showed that the learning tasks, regardless of the age of the learners, unevenly develop the levels of transformative learning for sustainability or green competences, with the level of embracing complexity in sustainability being the best represented of the analysed learning tasks, and the level of imagining sustainable futures and the level of taking action for sustainability being the least represented. Although aspects of sustainability are already intertwined with various geography curricula, both in basic science and in geography teaching, there are development opportunities in geography education, especially in the direction of action for sustainability.

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# TRAJNOSTNOST V GEOGRAFSKEM IZOBRAŽEVANJU

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Raziskava Trajnostnost v geografskem izobraževanju se osredotoča na kvantitativno in kvalitativno analizo učnih nalog, ki sledijo načelu trajnostnosti, v vzorcu učnih gradiv za pouk geografije v osnovnih in srednjih šolah. Kvantitativna analiza je pokazala, da je delež učnih nalog, ki zasledujejo načelo trajnostnosti v srednješolskih učnih gradivih višji v primerjavi z osnovnošolskimi učnimi gradivi. Kvalitativna analiza je pokazala, da učne naloge, ne glede na starost udeležениh v izobraževalnem procesu, neenakomerno razvijajo ravni transformativnega učenja za trajnostnost oz. zelenih kompetenc, pri čemer je v analiziranih učnih nalogah najbolj zastopana raven sprejemanja kompleksnosti v trajnostnosti, najmanj pa sta zastopani raven zamišljanja trajnostnih prihodnosti ter raven ukrepanja za trajnostnost. Kljub temu, da se trajnostni vidiki že sedaj tako v bazični znanosti kot pri pouku geografije prepletajo z različnimi geografskimi učnimi vsebinami, je mogoče zaznati, da so v geografskem izobraževanju razvojne priložnosti, zlasti v smer ukrepanja za trajnostnost.



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## 1 Introduction

Sustainability is a principle that fundamentally refers to an orientation towards meeting the living needs of the present generation (especially in economic terms – raw materials, energy) in a way that does not compromise the environment and the concomitant needs of future generations. Alongside this fundamental orientation, the principle also includes broader contexts, which we highlight below. The term *trajnostnost* (in Slovenian language) is derived from the English term *sustainability* (coined in the subtitle of the World Conservation Strategy report, linked to the IUCN debate on World Natural Heritage), which has another partly corresponding term in Slovenian in terms of its core message; this is the term *sonaravnost* (Plut, 2002; Plut, 2005), which also means “the principle that there must be a dynamic balance between the use and regeneration of natural resources, which means that natural resources of raw materials and energy must also be available for future generations” (Paulin, 2007). The term *sustainability* is also translated into Slovenian by the phrase *sustainable development*. Although this phrase is often used, the concept of sustainability represents a professional redefinition of this phrase. The need for redefinition has arisen because the term *sustainable development*, with its explicit diction, emphasises or even overemphasises development, i.e. (also) economic growth (which may initially be misunderstood as the necessity for development towards materialism) (Plut, 2005; Vovk, Davidovič, 2023), which often excludes social justice and the preservation of natural resources or having an environment that is healthy or at least in solid condition. The notion of sustainability, on the other hand, by its explicit diction, excludes the verticality of development growth and implies circularity (e.g., circular economy). The principle of sustainability comprises three building blocks and is understood as development progress that harmonises or balances economic activity, the social sphere and the natural environment as much as possible, i.e., it emphasises broader contexts than the economy or economic growth alone (Werbach, 2011).

International efforts in environmental education date back to the 1970s, when United Nations intergovernmental conferences on environmental education were launched in response to the increasing environmental degradation caused by population and intensive industrial growth. Thus, in 1976, the Tbilisi Declaration highlighted “the important role of environmental education for the protection and improvement of the environment throughout the world and for the reliable and

balanced development of the world's communities" (UNESCO and Slovenian National Commission for UNESCO, 2022, 66).

The term *sustainable development* was *first* defined in its familiar interpretation ("development that meets the needs of the present without compromising the ability of future generations to meet their own needs") in 1987 in a report by the World Commission on Environment and Development, "Our Common Future", also known as the Brundtland Report. Since then, dozens of conferences and summits on sustainable development have taken place, including the 2005-2017 decade, which was declared the UN Decade of Education for Sustainable Development (DESD) to "mobilize hundreds of thousands of people to reorient education globally towards a central goal: learning to live and work sustainably". (ibid.) From DESD, the Global Programme of Action on Education for Sustainable Development (GPESD 2015-2019) has evolved, with the aim of providing and strengthening concrete action on education for sustainable development. The Incheon Declaration on Education, adopted in 2015, identified the following for the period up to 2030: "Our vision is to transform lives through education, recognizing the important role of education as a key for development and for achieving the other proposed Sustainable Development Goals set out in the 2030 Agenda" (ibid.). At the 40<sup>th</sup> session of the General Conference of UNESCO (as the United Nations specialised organisation for education, science and culture), the implementation framework for education and training for sustainable development beyond 2019, "VITR for 2030" (2020-2030), was adopted. UN General Assembly Resolution 74/223 "encouraged governments to strengthen efforts to systematically integrate and institutionalize ESD in the education sector and other relevant sectors" (ibid.), explicitly recognizing the role of ESD as an integral element of the Sustainable Development Goals (op. cit. Sustainability Goals).

It can be noted that international "pro-environment" efforts in the field of education have been going on for about 50 years, and that since 2015, the process of education has been recognised by the international political and professional community as a key factor in the quest for sustainability. The priority areas of "VITR for 2030" are as follows:

- integrating education for sustainability into global, regional, national and local policies,

- paying special attention to promoting an integrated institutional approach in education, ensuring that *we learn what we live and live what we learn*,
- empowering educators with the knowledge, skills, values and attitudes consistent with sustainability objectives,
- identifying young people as key actors in addressing sustainability challenges and systematically training them (including in various youth organisations) in VITR,
- promoting action in the local environment, underlining the importance of action in real-life settings. (UNESCO and Slovenian National Commission for UNESCO, 2022, 54)

We are becoming increasingly aware that international (and educational) efforts in various fields have not borne the fruit we would have liked or needed, despite their 50-year duration. This is evidenced, among other things, by the exponential rise in greenhouse gas levels (Flisar, 2021), which has contributed to the fact that the average global temperature of the planet has risen by over 1°C since the late 1800s (UNESCO and Slovenian National Commission for UNESCO, 2022), and Slovenia, given its geographical specificities, is warming even faster than the global average – a 2°C rise in average temperature (Umanotera, 2023), with most of the warming occurring in the last thirty-five years. The 2019 report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services warns that one million species are in danger of extinction and that these losses will have severe consequences for ecosystems and people (UNESCO and Slovenian National Commission for UNESCO, 2022). At the same time, the world's population (despite a decline in the average global fertility rate) continues to grow and is projected to reach around 11 billion by 2100 (Moustakerski, 2015), which naturally implies a greater consumption of natural resources due to human needs and activities, or that the exponential rate of unwanted change will increase if the lifestyles of the (economically) developed world are maintained unchanged.

This implies that we inevitably need to adapt at the individual and societal level, and that this adaptation must be strongly supported by education as one of the fundamental systems of development. Stefania Giannini, Assistant Director-General for Education at UNESCO, highlights an important dilemma: “Increasingly, we are asking ourselves: is what we are learning really relevant to our lives, will it help us to

ensure the survival of our planet?” (UNESCO and Slovenian National Commission for UNESCO, 2022,, 1). On the other hand, starting from the VITR 2030 priority areas – are we really learning about what we are living, or are we living what and how we are learning?

The dilemmas described above motivated us to focus in the present contribution on one part of the geography education process, i.e., on the inclusion and didactic evaluation of sustainability learning content in selected geography education materials, i.e., textbooks and independent workbooks for geography in primary and secondary schools.

## 2 Theoretical framework

For educational purposes, given the state of the planet and the processes that are taking place, it makes sense to start by recording the substantive issue focal points or related areas of educational potential, i.e., sustainability. In a generalised sense, these are as follows:

- the quest for quality of coexistence (challenged in various dimensions by population growth, resource scarcity, environmental migration and other migration that is more or less directly related);
- the need to reduce consumption (efforts to develop a circular economy),
- the need to control pollution of all kinds,
- the need to protect habitats and living creatures. (adapted from Moustakerski, 2015)

While recognising the educational potential in the field of sustainability, it is also important to define the target competences. The European Commission’s GreenComp (2022) document defined a European framework of competences for sustainability as a common basis for learners, whatever their level of education, and guidelines for educators for all learning environments (formal or informal), and attempted to define by consensus what sustainability as a competence means. The GreenComp framework consists of 12 competences grouped into four domains:

1. embodying the values of sustainability (valuing sustainability, supporting equity, promoting nature);
2. embracing complexity in sustainability (systems thinking, critical thinking, problem formulation);
3. imagining sustainable futures (future literacy, resilience, exploratory thinking);
4. action for sustainability (political engagement, collective action, individual initiative) (Bianchi et al., 2022, 2)

Alongside the diagnosis of educational needs, target content and competences, the question that drives the achievement of knowledge in the broadest sense is also crucial for educators: how to approach it in order to make the effort effective. The concepts of global and transformative learning have emerged in the field of education for sustainability, alongside an awareness of the cognitive processes, social, emotional and behavioural aspects of the individual and the group that need to be taken into account in a combined way in all kinds of education. Global learning is an umbrella concept that highlights a range of themes (awareness and knowledge of environmental challenges, support for a critical understanding of an interconnected world, support for the values of equality, equity, solidarity, justice, democracy, and the promotion of dialogue or the fight against stereotypes, hate speech and populism) that relate to the individual's role in society and emphasise his or her interdependence and involvement in global developments. The aim is to achieve active citizenship and to realise the vision of a model of partnership between peoples, cultures and religions at the micro and macro levels. (North-South Centre of the Council of Europe, 2019) Transformative learning (i.e., learning that achieves real change in the way people think and live) is a concept that has several interpretations, but in the context of sustainability, it relates directly to the question of how to achieve success in education for sustainability. This is achieved when learners “challenge the entrenched structures of Western ways of knowing, of being (e.g., extractivism, i.e., the belief that the Earth is our property and can be exploited without limit; speciesism, i.e., discrimination against other species; and unlimited growth)” (Košmerl&Mikulec, 2022, 22), and when “alternative visions of ways of being and knowing are foregrounded, in which we are all interrelated and interdependent” (ibid.). Thus, three phases are highlighted in the process of transformative learning for sustainability:

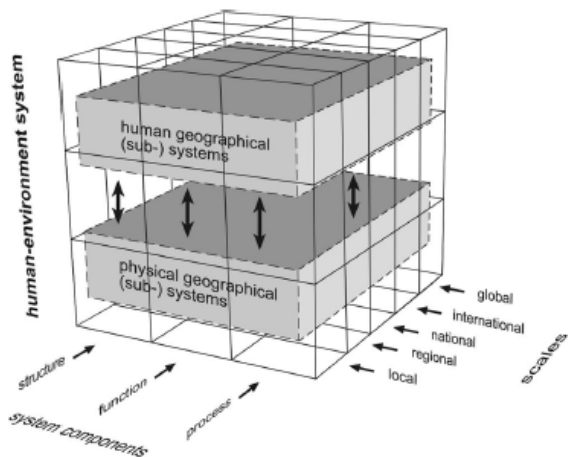
- critical analysis of the current situation around the world,
- a vision of possible alternatives to the currently dominant models of thinking and being,
- implementing a process of change that will lead to responsible global citizenship. (UNESCO and Slovenian National Commission for UNESCO, 2022)

The phases of transformative learning for sustainability are aligned at the core with the GreenComp competency framework, highlighting three aspects: knowledge, values and concrete action.

The system of geography education in Slovenia has always responded to societal needs and related international efforts in the subject area. While in the first three decades after 1950, geography education focused on learning about the Earth, evaluating and analysing its potentials (natural resources), in the 1980s it shifted towards awareness-raising and protection of the environment, and then, at the beginning of the new millennium, towards efforts to ensure survival on the planet – to “sustainable development”. The mission of future geography education is undoubtedly to strengthen awareness of the need to establish better relations towards the environment/use of space, life forms and future generations (sustainability). In this respect, the fundamental gnoseological or epistemological essence of geography already corresponds to sustainable competences or transformative learning for sustainability. Geography is an interdisciplinary and complex science that aims to study the dynamic integration and interaction of natural and social elements. Its conception, as presented graphically by the German Geographical Society, is illustrated in Figure 1.

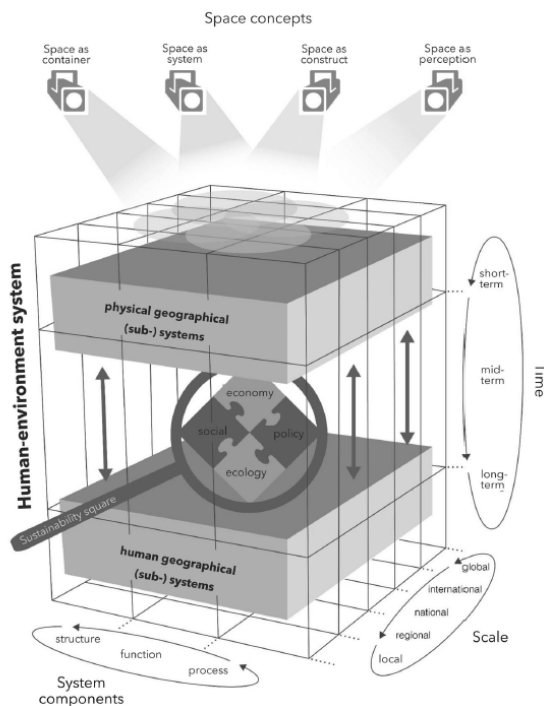
At the core of Geography is the ‘human-environment system’ as the central underlying concept, the system components (‘structure-function-process’) and the spatial levels as the basis for the concretization of concepts in the study of the human-environment system (Deutsche Gesellschaft für Geographie, 2020, 11). The presented concept of geographical science and the resulting geographic education is built upon in relation to the idea of sustainability, and its graphic structure can resemble the example of geography teaching in Germany (Figure 2) or be as structurally simplified as the example of geography teaching in Mexico (Figure 3).





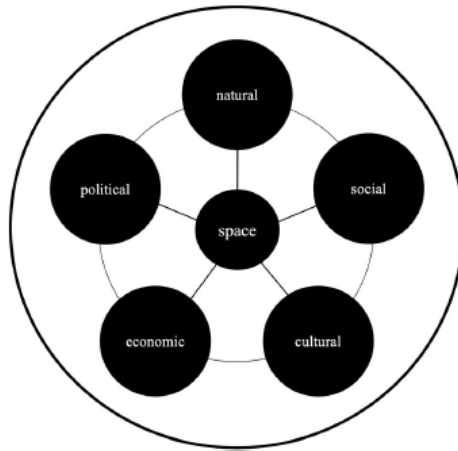
**Figure 1: Basic concepts of spatial analysis in Geography**

Source: Bagoly-Simó, 2022, 56 (after DGfG (Deutsche Gesellschaft für Geographie), 2014, 11)



**Figure 2: Concepts of spatial analysis in geography in Germany with explicit reference to the idea of sustainability**

Source: Bagoly-Simó, 2022, 57 (after Fögele, 2016, 73, amended)



**Figure 3: Key concepts of geography in the Mexican education system.**

Source: Bagoly-Simó, 2022, 58 (after SEP, 2011, p. 16, amended).

However the essence of Geography as a science is structurally realised in geography teaching and the idea of sustainability is integrated in different educational systems (in Slovenia, basically similar to Germany, combining a target-competence thematic and regional approach, while in Germany a competence-thematic approach prevails) (Klecker, 2023), the essential components of green competences and transformative learning for sustainability remain consistent with the conception of geographic science. The Lucerne Declaration (Haubrich, Reinfried, & Schleicher, Citation 2007) and the Declaration on Geographical Education for Sustainable Development (Haubrich, Reinfried, & Schleicher, Citation 2007) also recognize the connections between geographic science, geographic education and the fields of education for sustainability. (Haubrich, 2007; IGU-CGE, 2016; after Bagoly-Simó&Kriewaldt, 2022) Geography as a science promotes the understanding of complexity, in this context, critical analysis of the world situation, encourages the imagining of development alternatives, and through this, influences the development of values and responsible action in real life circumstances. As Bagoly-Simó (2022, 65) notes, geography teachers today, as in the 1990s (Haubrich, 1992), stress the unique contribution of geography to sustainability, but there is no better time than the present to critically re-evaluate the contribution of geography education and to work on a viable plan to contribute to the current major challenges facing humanity. The present study has been designed with this in mind.

In our study, when examining the integration and didactic evaluation of sustainability learning content in selected geography educational materials, i.e., textbooks and independent workbooks for geography in primary and secondary schools, we focused on the learning tasks, but not on the rest of the text and the illustrative-graphic representations in the textbooks and independent workbooks, insofar as these were not directly related to the learning tasks. We assumed that the learning tasks would be the most likely to show a variety of learning approaches. It was also important for us to start from the premise that textbooks and workbooks, as the main teaching aids, can be used to identify which topics, examples and learning tasks are present in the reality of geography lessons, and that these can also be used as a basis for inferring, in part, the didactic approaches in the actual delivery of the lessons. Textbooks reflect the expected knowledge of facts and skills that are perceived as important by the education system within a given society (Lipovšek, 2021 in Konečnik Kotnik&Kolnik, 2023).

The main objectives of the research are consequently related to the evaluation of (1) the quantity of representation and (2) the quality of the didactic diversity of learning tasks. In doing so, we included only those learning tasks that were *directly* linked to key aspects of sustainability. As we have already pointed out in this contribution, and we point to this in the following also, the structure and contents of geographical science and geographic education are basically integrally correlated with the contents of sustainability. Within the quantitative analysis, we compared the quantitative representation of sustainability-related geographical learning tasks, taking into account the following indicators:

- type of school,
- class,
- the number of learning tasks, i.e. questions or assignments for pupils related to sustainability.

The qualitative analysis of didactic diversity was carried out on the basis of indicators directly derived from the three dimensions of transformative learning for sustainability, or the four leading European green competences. These were as follows:

- critical analysis of the current situation worldwide (embracing complexity in sustainability ),
- a vision of possible alternatives to the currently dominant models of thinking and living (imagining sustainable futures) ,
- implementing a process of change leading to responsible global citizenship (action for sustainability); and
- embodying the values of sustainability.

The assumption we have pursued here is that even if the number of learning tasks in a textbook or independent workbook is comparable or balanced in terms of the amount of information with other content, there is a more didactically relevant question. This involves the extent to which an otherwise maybe balanced number of learning tasks can also reflect the achievement of qualitative criteria, since information knowledge is not necessarily interconnected or inter-networked. i.e. in terms of developing diverse learning competences and thus also in terms of transferring learning knowledge into life practice or in terms of transformativeness (adapted from Konečnik Kotnik&Kolnik, 2023).

### **3 Methodology**

In order to prepare the theoretical basis and the criteria for the empirical part of the research, we used the descriptive method of literature research review in the field of sustainability and geography education.

In the empirical section, we conducted a two-part, non-experimental empirical study. In the first part, we collected numerical data for selected geography textbooks and independent workbooks for primary and secondary schools by quantitative analysis according to the criteria presented in the theoretical framework. The data obtained were comparatively processed at the level of basic descriptive statistics. In the second part of the empirical research, we examined the data collected on the basis of descriptive criteria at the level of a broader interpretative qualitative analysis, focusing on the learning tasks for pupils according to the selected didactic elements. We began from the criteria presented in the theoretical framework of the paper, based on the concept of transformative learning for sustainability and on the European Green Competences.

The purpose of the research was to determine whether the learning tasks included in these learning materials enable students to develop and acquire a variety of learning skills that are consistent with the principle of sustainability. Based on this underlying purpose, we formulated the key research objectives and initial assumptions presented in the previous section. We further assumed that we would find a quantitatively higher representation of sustainability learning tasks in secondary school learning materials compared to primary school learning materials. In the qualitative analysis of the didactic diversity of sustainability learning content, we further assumed that the learning tasks, questions or assignments for pupils or students would unevenly develop all levels of transformative learning for sustainability, i.e., Green competences, with the first level, i.e., critical analysis of the current global situation (embracing complexity in sustainability), being the most represented, the second level of envisioning possible alternatives to the currently dominant models of thinking and living (imagining sustainable futures) being less represented, and the third and fourth levels (implementing a process of change leading to responsible global citizenship – acting for sustainability and embodying the values of sustainability) being significantly less represented.

### **3.1 Sample**

In the study, we analysed seven current and approved textbooks for geography classes in all grades of secondary school, trying to have a fairly balanced coverage of textbooks from two publishers, which will be referred to as Publisher 1 and Publisher 2 in the discussion of the results. For the primary level, we analysed sixteen textbooks and independent workbooks for all grades where geography is taught, i.e. grades 6, 7, 8 and 9 (we have presented the quantitative data separately for textbooks and independent workbooks in the tables), and we have tried to achieve balanced coverage of the teaching materials from the same two publishing houses. For each publishing house, we have analysed eight sets of teaching material—four textbooks and four independent workbooks. Information on the textbooks and independent workbooks analysed can be found in the list of references and sources.

The results of the survey will be presented in two parts. In the first part, we will present the results of the quantitative analysis, and in the second part, the results of the qualitative analysis, each time separately for the primary and secondary levels of geography education.

#### 4 Results with discussion

In the first part of the study, the quantitative representation of sustainability-related learning tasks in selected validated textbooks and independent workbooks for geography classes in primary and secondary schools was examined on the basis of set criteria. In so doing, we took into account the indicators already mentioned:

- type of school,
- class,
- number of sustainability-related learning tasks.

In defining the sustainability orientation of the learning tasks, we have drawn on the theoretical frameworks outlined in the initial sections of this contribution. We considered revision, consolidation and other assignments as learning tasks, as well as the tasks included in the rubrics with additional challenges for pupils and students.

**Table 1: Quantitative analysis of the learning tasks in selected primary school teaching materials from a sustainability perspective – Publisher 1**

Class	Resources	Total No. of learning tasks	No. of learning tasks related to sustainable content	Share of learning tasks related to sustainability (%)
6 <sup>th</sup> grade	textbook	48	1	2.08
	independent workbook	64	1	1.56
7 <sup>th</sup> grade	textbook	122	10	8.20
	independent workbook	122	9	7.38
8 <sup>th</sup> grade	textbook	123	15	12.20
	independent workbook	128	18	14.06
9 <sup>th</sup> grade	textbook	107	11	10.28
	independent workbook	122	20	16.39
<b>Total</b>		<b>836</b>	<b>85</b>	<b>10.16</b>

Source: Author

**Table 2: Quantitative analysis of learning tasks in selected primary school teaching materials from a sustainability perspective - Publisher 2**

Class	Resources	Total No. of tasks	No. of learning tasks related to sustainable content	Share of learning tasks related to sustainability (%)
6 <sup>th</sup> grade	textbook	129	1	0.78
	independent workbook	129	1	0.78
7 <sup>th</sup> grade	textbook	137	18	13.14
	independent workbook	137	18	13.14
8 <sup>th</sup> grade	textbook	127	13	10.24
	independent workbook	127	13	10.24
9 <sup>th</sup> grade	textbook	114	14	12.28
	independent workbook	116	14	12.07
<b>Total</b>		<b>1016</b>	<b>92</b>	<b>9.05</b>

Source: Author

A quantitative analysis of the learning tasks in the selected primary school teaching materials showed that the representation of sustainability-directly related learning tasks is similar in the textbooks and independent workbooks from both publishers (Publisher 1 in a proportion of 10.16% of all learning tasks, and Publisher 2 in a proportion of 9.05% of all learning tasks), although the learning materials from the two publishers differ in terms of authorship, scope, illustrative and graphic material, content and didactic elements, and technical implementation. The sustainability-directly related learning tasks are represented differently by grade in these teaching materials. For both publishers, the lowest relative representation of such tasks was in the sixth grade, which is the grade with the lowest number of teaching hours in the primary school curriculum (Ministry of Education of the Republic of Slovenia, 2014). In the case of Publisher 1, the number of sustainability-oriented learning tasks in the teaching materials tends to increase by grade from grade 6, with an average of 1.8%, to grade 9, with an average of around 13%, while in the case of Publisher 2, the vertical quantitative gradation from grade 6 onwards is not constant, or rather, the proportion of sustainability-oriented tasks included is quite similar in grades 7, 8 and 9 (between 10 and 13% of all learning tasks).

**Table 3: Quantitative analysis of learning tasks in selected secondary school teaching materials from a sustainability perspective - Publisher 1**

Class	Resources	Total No. of tasks	No. of learning tasks related to sustainable content	Share of learning tasks related to sustainability (%)
1 <sup>st</sup> year	textbook	132	22	16.67
2 <sup>nd</sup> year	textbook	78	13	16.67
3 <sup>rd</sup> year	textbook	42	13	30.95
4 <sup>th</sup> year	textbook	63	8	12.70
<b>Total</b>		<b>315</b>	<b>56</b>	<b>17.8</b>

Source: Author

In the case of the secondary school materials, although there are slightly higher differences in the representation of sustainability-directly related learning tasks between the two publishers, the representation of these learning tasks is similar in both publishers, at around one-fifth of the total, which is around 10% higher than for the primary school materials.

**Table 4: Quantitative analysis of learning tasks in selected secondary school teaching materials from a sustainability perspective - Publisher 2**

Yearbook	Resources	Total No. of tasks	No. of learning tasks related to sustainable content	Share of learning tasks related to sustainability (%)
1 <sup>st</sup> year	textbook	76	18	23.68
2 <sup>nd</sup> year	textbook	59	11	18.64
3 <sup>rd</sup> year	textbook	49	14	28.57
<b>Total</b>		<b>184</b>	<b>43</b>	<b>22.4</b>

Source: Author

No particular quantitative order can be discerned in the share distribution of the sustainability learning tasks across the years, but the absolute number of tasks considered is the highest in the first year, because the direct objectives of so called sustainable development are implicit in the curriculum of the first year of upper secondary school as a specific chapter (Polšak et.al., 2008).

Based on a comparative analysis of the representation of sustainability-related learning tasks in these teaching materials, it can be concluded that such tasks are more frequently represented in secondary school geography teaching materials (1/5 of all learning tasks) than in primary school geography teaching materials (1/10 of all learning tasks), with no significant differences between the two publishers within each educational level. We have shown that the content of sustainability is directly



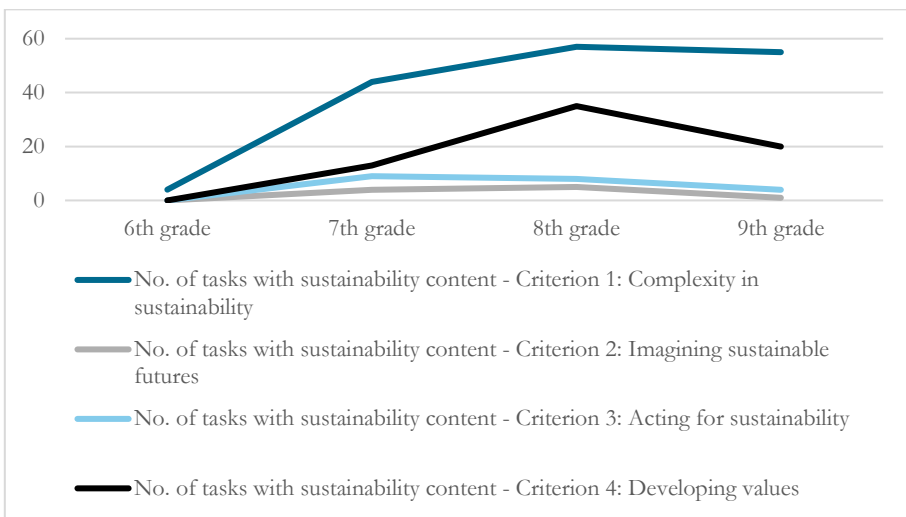
identifiable in the learning tasks in the geography teaching materials.. It can be observed that sustainability-related content is included in the learning tasks in different content areas within geography, both in physical geographic topics and in socio-geographic topics, or is related to various spatial elements and their interconnection, including the spatial, environmental and social conflicts of these interconnections, which are addressed in the geography curricula through a thematic or regional approach. Although certain differences in the share of learning tasks with direct sustainable content can be detected by grade, these are not consistent, nor can they be justified from the point of view of content or from the point of view of the amount of hours devoted to the subject (in the latter case, the sixth grade of primary school may be an exception, in which the minimum number of teaching hours according to the primary school curriculum is dedicated to geography and where basic geographical content is discussed with an emphasis, such as orientation, cartography, the Earth as a whole, etc. (Kolnik et.al., 2011)). The learning tasks addressed relate to knowledge and evaluation of and planning for tackling pressing environmental issues, as well as economic and socio-economic issues. Among the identified sustainability-oriented learning tasks, the majority are directly related to environmental issues.

More didactically important than quantity is the question to what extent the number of pieces of information can reflect the achievement of qualitative criteria (Konečnik Kotnik&Kolnik, 2023). We will refer to this issue below. In the qualitative analysis, we included all the learning tasks that were also included in the quantitative analysis, this time without distinguishing between the two publishers, as we did not detect a marked difference between them on average in the quantitative analysis. The qualitative assessment aimed to determine the absolute situation concerning the inclination of these learning tasks towards the different elements or dimensions of transformative learning for sustainability or green competences in the geography learning materials at both educational levels. The qualitative analysis of didactic diversity was carried out on the basis of indicators directly derived from the three dimensions of transformative learning for sustainability or the four leading European green competences:

- critical analysis of the current global situation (embracing complexity in sustainability),

- a vision of possible alternatives to the currently dominant models of thinking and living (imagining sustainable futures),
- implementing a process of change leading to responsible global citizenship (action for sustainability); and
- embodying the values of sustainability.

The absolute trend in the number of sustainable learning tasks, depending on which qualitative criterion they address, is shown in Figure 4 and Figure 5. It should be added that a single learning task can address one or more of the qualitative analysis criteria, which means that it could have been considered for more than one criterion.

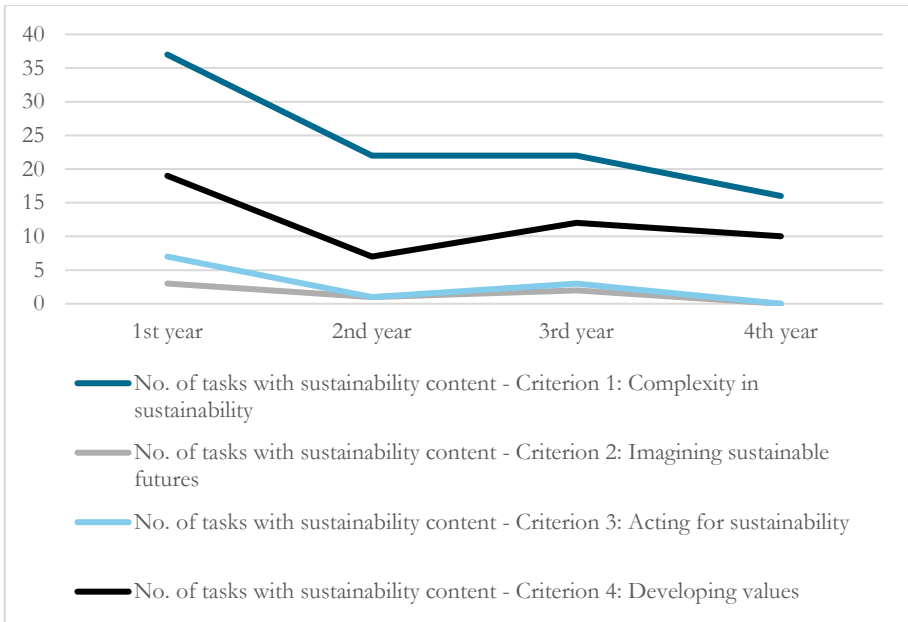


**Figure 4: Absolute number of learning tasks according to the qualitative analysis criteria - primary school.**

Source: Author.

A qualitative analysis of sustainability learning tasks in selected teaching materials for geography lessons in primary school showed that the most frequently represented learning tasks in all grades are those related to a critical analysis of the current situation in the world, which we believe is essentially overlapping or closely linked to the green competence of embracing complexity in sustainability. This is an expected consequence of the affinity of this criterion of qualitative analysis with the epistemological essence of geography (see also Bagoly-Simó, 2014, 2022; Chang&Kidman, 2018; Drozg, 2020; Maude, 2022; Rogelj et.al., 2023). Although in

geography education, we approach learning about the complex interconnectedness of spatial elements in a systematic and gradual way (one element is studied first, to which the next one is added, etc., until students can appreciate how spatial elements influence each other) (Brinovec, 2004), and this may at first sight appear to be a non-complex approach, it is nevertheless necessary to re-expose that, in fact, the whole design of the geography course supports the Green Competence considered. (Bianchi et.al., 2022) In the analysis, however, we have highlighted only those learning tasks that explicitly include a complex sustainability dimension. The second and third dimensions of transformative learning (criteria 2 and 3 of the qualitative analysis) are rarely represented in teaching tasks for primary school. This means that the learning tasks rarely refer to envisioning or seeking, or thinking about potential alternatives to currently prevailing models of thinking and living, and thus to anticipating future developments or imagining sustainable futures, and to concrete action, i.e., to actively implementing a process of change in the context of responsible global citizenship or to taking action for sustainability. In summary, the representation of all the identified criteria for qualitative analysis in the learning tasks is lowest in grade 6, when students are just learning about the basics of geography (Kolnik et.al., 2011), and highest in grade 8, when they are learning about the regional geography of the world (ibid.), before dropping slightly again in grade 9 when dealing with the geography of Slovenia (ibid.). The trend could be partly explained by the increasing age and receptiveness of pupils to more complex and problem-based thinking, and partly by the core content of the curriculum or even with the number of hours devoted to geography lessons each year, although maybe with the exception of the sixth grade, all the listed is not a relevant starting point (see also Scheyvens et.al., 2008; Healey&Roberts 2004), as the analysis for the secondary level also shows.



**Figure 5: Absolute number of learning tasks according to the qualitative analysis criteria - secondary school.**  
Source: Author.

In the case of the secondary school, as with the primary school, we included in the analysis all the learning tasks that we identified in the quantitative analysis process as related to the principle of sustainability. Since we did not have teaching materials for the fourth year from one of the publishers, we weighted the number of identified learning tasks that matched the qualitative analysis criteria for that year. Again, a single learning task can relate to one or more of the qualitative analysis criteria, so the same learning task can be considered for more than one criterion.

The qualitative analysis showed a similar situation regarding the quantitative representation of the qualitative analysis criteria in the learning tasks as in the primary school example. Critical analysis of the current world situation or the green competence of embracing complexity in sustainability dominates, while imagining sustainable futures and concrete action for sustainability are represented in very low numbers. Learning tasks in which we identified a direct reference to the development of values ranked second of all four criteria. The representation of the dimensions of learning for sustainability does not increase consistently with the year

or age of the students, but shows a summative decline between the first year (with the highest representation) and the fourth year. This may be because the objectives of sustainable development (sustainability) are also directly implicit in the curriculum of the first year of gymnasium as a specific chapter (Polšák et.al., 2008) and because geography is 'only' an optional subject in the fourth year leading to the final external exam (Matura) (Gaal et.al., 2022), but it would nevertheless make sense, as adolescents move into adulthood, to appeal more strongly to their active citizenship in the broadest sense, especially when dealing with own country or local environment, as it applies to geographical subject in the fourth year of gymnasium (or the 9th grade of primary school) Although at primary school level we found the highest representation of the qualitative analysis criteria in the assignments for World Regional Geography, the situation at secondary school level does not coincide, with the highest representation of the criteria in the assignments for General Geography, followed by European Regional Geography and then World Regional Geography. Therefore, neither the general/thematic nor the regional approach is directly linked to the possibility of integrating sustainable content. (see also Scheyvens et.al., 2008)

A qualitative analysis of the learning tasks in the selected teaching materials for geography in primary and secondary school showed that they are dominated by aspects of transformative learning related to information literacy. Information knowledge is certainly basic, especially in the contemporary context where the public often draws simplistic conclusions and assumptions and exploits sustainability in various ways (greenwashing) (European Parliament, 2024). The lack of concrete action for sustainability, of implementing a process of change leading to responsible global citizenship, i.e., action for sustainability in the context of education, is a worrying aspect. A similar situation has been traced in other research (Konečník Kotník&Kolník, 2023; Klecker, 2023; Scheyvens et.al., 2008).

## **5 Conclusion**

In the Sustainability in Geographical Education study, we focused on a quantitative and qualitative analysis of learning tasks, directly connected to sustainability, in a sample of teaching materials, i.e., textbooks and independent workbooks for geography classes in primary and secondary schools. Although the study was limited to a sample of teaching materials and the latter have a limited (but usually high)

impact on real educational practice, some guidelines can be derived on the inclusiveness and didactic diversity of sustainability education in geography teaching.

A quantitative review of the sample of learning materials showed that we can confirm the assumption that the proportion of learning tasks that directly follow the principle of sustainability (in relation to the total number of learning tasks) is higher in secondary school learning materials compared to primary school learning materials. Since the question of the extent to which learning content/tasks meet the qualitative criteria in terms of transferability in terms of developing diverse geographical or general learning competences and thus also in terms of translating learning into life practice is more didactically relevant than quantity, a broader interpretative qualitative analysis of the didactic diversity of learning tasks was carried out. This confirmed the assumption that the learning tasks, questions or work assignments for pupils unevenly develop the levels of transformative learning for sustainability or green competences, with the first level, i.e., critical analysis of the current world situation (embracing complexity in sustainability), being the most represented in the learning tasks, followed by the fourth level of analysis, i.e. embodying the values of sustainability. The second level - visions of possible alternatives to the currently dominant models of thinking and living (imagining sustainable futures) and the third level (implementing a process of change that will lead to responsible global citizenship - action for sustainability) are the least represented.

In the curricular reform taking place in Slovenia, sustainability goals have become a cross-curricular content and are included in a meaningful context in all subjects of the educational vertical, both primary and secondary. This is a logical consequence of the importance of content for everyday and future life, which is also reflected in similar international educational trends (International Research in Geographical and Environmental Education, 2023). As we pointed out in the contribution, empirical studies also show that geography basically, in contrast to other subjects, has a strong conceptual and substantive connection with sustainability (Bagoly-Simó 2013, 2014). The results of our research showed, starting from a broader conceptual sense of sustainability, where these connections with existing geographic education in Slovenia are particularly strong and where they are weaker. Thus, teaching materials (textbooks, independent workbooks), which have a strong influence on real curricular practice, show, which is also confirmed by some findings from the

international arena, that teachers (as well as curricular documents such as syllabuses) are faced with a dilemma during the construction of a solid geographical knowledge and urgent measures - challenges related to sustainability that go beyond the role of mere mediators of this knowledge. (International Research in Geographical and Environmental Education, 2023). Certainly, a good measure of basic geographical knowledge (concepts of space, knowledge of the characteristics of places or geographical spaces of different hierarchical levels and sizes, interconnections of spatial elements, etc.) is necessary as a contribution not only to the understanding of geography, but also as a foundation for understanding sustainability (see also Maude 2022). It could be argued that the whole of geographical knowledge contributes to the latter, even if some of it is included in education gradually (e.g. by dealing with individual elements of space, such as the rock base, climate or population, one by one), which may seem - however, it is also a result of taking into account the didactic principles, such as the didactic principle of systematicity and gradualism - it does not always meet the criterion of the complex connection of these elements, which is an important category of sustainability. Within the entire spectrum of geographical knowledge, there are some aspects that are particularly directly related to sustainability, and we included them in our research. In addition to all geographic knowledge (learning objectives and contents), these aspects show that in the future (and also in the curricular reform underway in Slovenia) it is necessary to find an appropriate relationship between the amount of theory and facts (even if a solid measure of only these is necessary both for objective knowledge and, based on it, for the embodiment of values that lead to conduct) and active actions for sustainability, that is, by implementing the actual process of changes that will ultimately lead learners to responsible global citizenship. As Figure 6 shows, geographical education offers, indirectly and directly, many important opportunities for sustainable education and training of young people (from learning about the characteristics of places and geographical spaces, spatial, orientation and cartographic ingenuity, understanding of spatial structures or the interconnections between spatial elements and the functioning of spatial systems, to incentives for independent spatial research, spatial interpretations and, ultimately, active action in space), and in this context, it is necessary to give some of them more attention than is currently given to them due to the modern challenges of sustainability; even if partly at the expense of the now heavily represented. The left column of Figure 6 thus shows which of the listed emphases of geographical education are more emphasized in Slovenia today - circled, and which should be given more attention

in the current curricular reform compared to the past - circled in the right column of Figure 6.

TODAY	TOMORROW
<p><b>1 stories about places and landscapes ....</b> for wonder, a curious desire to explore diversity;</p> <p><b>2 fundamental cartographic and orientation ingenuity...</b> to develop a spatial identity, to find one's way safely in a complex world;</p> <p><b>3 understanding the structures and functioning of spatial systems ...</b>to know, understand and respond responsibly to current issues in the world's landscapes;</p> <p><b>4 developing skills for independent exploration of</b> spatial systems...to balance outdoor movement and digital competence ;</p> <p><b>5 developing spatial interpretation skills</b> (geographic communication literacy)... for critical evaluation, accessible communication, interpretation and reasoning about spatial information;</p> <p><b>6 encouraging active participation in personal and social realities</b> (responsibility for place, people and self).</p>	<p><b>1 stories about places and landscapes ....</b> for wonder, a curious desire to explore diversity;</p> <p><b>2 fundamental cartographic and orientation ingenuity...</b> to develop a spatial identity, to find one's way safely in a complex world;</p> <p><b>3 understanding the structures and functioning of spatial systems ...</b>to know, understand and respond responsibly to current issues in the world's landscapes;</p> <p><b>4 developing skills for independent exploration of</b> spatial systems...to balance outdoor movement and digital competence ;</p> <p><b>5 developing spatial interpretation skills</b> (geographical communication literacy)... for critical evaluation, accessible communication, interpretation and reasoning about spatial information;</p> <p><b>6 encouraging active participation in personal and social realities</b> (responsibility towards place, people and self).</p>

**Figure 6: What does geography education in Slovenia offer young people today, and what more could it offer? (circled - emphasis on representation)**

Source: adapted from Konečnik Kotnik, Kolnik 2023, 307.

The key here is also the question of understanding the relationship between deep and applied knowledge and active learning methods or pedagogy. It concerns three aspects of the latter: connecting everyday life and everyday knowledge with school knowledge and vice versa, practicing geography and debating/discussing the meaning of geography (see also Roberts, 2009). The revision of the curricula, which will be followed by the revision of the teaching materials, is an opportunity to strengthen the incentives for developing diverse competence for sustainability and especially emphasize responsible action in real life circumstances. Given these challenges, further research efforts are needed based on the questions below, including in support of curricular changes:



- What kind of transformative knowledge, with a focus on concrete activities in real life situations, can be offered to learners?
- Which contents should be eliminated from the (content-heavy) curricular materials (taking into account the hourly status of the subject in the existing curriculum) in order to create time and opportunity for transformative learning?
- How do different concepts of geographic education affect the success of transformative learning?
- What are the specific pedagogical and didactic approaches that best support transformative learning?
- What kind of empirical research will effectively support this transformative learning?
- How to check and evaluate the results of transformative learning?
- Do these results really support economic, environmental and social sustainability?
- Do future (and current) teachers have enough education and training that enable an optimal understanding of the content in approaches to convergence and awareness of the connection between different types of geographical knowledge and sustainability, so that they can confidently support young people in facing the climate and other challenges of living on the planet? (see also Bagoly-Simó&Kriewaldt, 2022; Chang&Kidman, 2018)

Equipping students, future teachers and current teachers of geography with geographical knowledge, which will be a solid and clear information base, as well as adequate for identifying more or less sustainable behavior, for predicting more suitable alternatives and for more sustainable real action, is definitely one of the outstanding important foundations of future geographical research and education. Only this should support young people well in the process of developing their personal values, which will lead to functioning in society.

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