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Current trends of teaching of school geography in Romania

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Abstract: In recent decades, human society has undergone a series of changes unforeseen a century ago, and traditional education systems around the world have been forced to adapt to the new ideological shifts. Geography is one of the school subjects that has constantly adjusted its value and educational priority system in order to assimilate new approaches. Technological development and digital interconnection have reshaped the entire social structure, changes that didn't take long to reshape the ways of teaching geography in schools. Meanwhile, the unprecedented economic development is being fueled by the growing costs of the increasing human pressure in all of the planet's geospheres. Under these circumstances, school geography has adapted its content in line with new environ-mental policies, which focus on eco-education through sustainability and sustainable development. The core information of school geography needs to include approaches that are adapted to each generation, corresponding to its problems, interests and dilemmas. Currently, the research in this area highlights two main directions of thematic and methodological innovation present in geography lessons worldwide: a) teaching/learning about digitization, technology, GIS platforms; b) educating generations about sustainable development and environmental responsibility. Therefore, this study proposes an analysis of the convergence of Romanian school geography with current international teaching directions. For this purpose, the construction, contents and ways of approaching these concepts in the current pre-university geography literature were examined through the documents that officialize the trends and teaching priorities – the textbooks and school curricula..

Keywords: *Romania; Curriculum; Geography Textbooks; Sustainability; Sustainable Development; Environment; Digitalization*

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Introduction

Why is geography necessary?

From an academic point of view, the geography classes interconnect all the sciences in the pupils' traditional timetable. A simple, factual example would be: the chemical reactions responsible for the greenhouse effect are amplified by the global economic boom and the unprecedented scale of natural resource exploitation, which, due to the negative impact on biodiversity, have brought the political leaders to the negotiating table, where they have committed to resolutions designed to ensure the protection of nature. Separately analyzed, this complex cause-effect chain would translate into:

- in Physics and Chemistry, the key questions focus on *how* and *why* the processes and phenomena occur, regardless of place and time,
- in History the subjects focus on time, duration, causes and effects of events, respectively the issues focus on *when* and *why*,
- in Biology the primary emphasis is on *what would happen if* and *how* that influences the evolution of the living world.

Fundamentally, all the study subjects of these sciences can be located at the intersection of the interactions between nature and society. Then, (why) do we still need geography in schools? The answer is yes, because in geography, the *where* matters. In other words, the space is the central pillar from which all geographical concepts start and on which they are built. For a long time, education policy makers have not fully capitalized on the educational potential of geography (Biddulph et al., 2015). Popular views of the geography taught in schools have been associated with memorizing and locating on a map the cities, mountains, rivers, or learning the flags of the countries by heart. In the general curriculum, geography was not considered as "serious" or "hard" a discipline as the others mentioned above (Murphy, 1998). Unfortunately, current educational policies demonstrate that these preconceptions about the recognition of geography as a scientific discipline have not yet disappeared, although its value in terms of shaping average individual's general knowledge is socially accepted. The most obvious method of limiting its importance is reflected through the allocated amount of time: in most of the countries, with some exceptions, geography is given only one hour per week. This restricts the quantity and quality of geographical information that can be learned in a timely manner. Even with these

limitations, teachers try to address the social, economic and political challenges to which geography can provide relevant answers.

In Romania, in the last decades, there has been an ideological transition, at least officially, from the reproduction to the application of the geographical information. Although the time available per week has remained unchanged, geography is no longer taught only by textbooks, with long texts that have to be memorized, as modern teaching tools, such as computers or smartphones connected to the Internet, are increasingly included. Breaking away from the "tradiţional" means reforming curricula and textbooks in order to give geography a more prominent place in pupils' list of interests. The curricula ideology adopted after 2010 moves away from the descriptive and encyclopedic style of the 1990s and aligns with contemporary international trends in terms of content, methodology and teaching techniques. Modern school geography aims to become a flexible, functional and, crucially, an applicable subject, responding to the most important issues of the contemporary world with regard to pupils' value priorities. Currently, the fundamental thematic directions taught in preuniversity geography around the world are digitalization, GIS, sustainability and sustainable development. Considering the technological and informational advances of recent times, school curricula have begun to pay an increasing attention to the development of the digital skills related to geographic orientation and exploration. In the classroom, on a laptop or on a personal smartphone, with internet connection, every corner of the planet is just within a clicking distance and these digital information resources should be fully maximized. Therefore, the new philosophies of recent school curricula must juxtapose with pedagogical innovations, following the new technological advances and environmental phenomena while engaging pupils individually and building the sense of community coherence.

For pupils and teachers, the educational priorities of school curricula are reflected within the contents and the structure of the textbooks. Innovation in teaching standards means innovation in textbooks and vice versa. In this equation, in addition to the core geographic content, textbooks should address the relevant topics for the 21st century citizens (Lambert, 2010). Therefore, how (much) these teaching tools have been modernized?

The *Man and Society* curriculum area gives geography one hour per week; although insufficient, within the budget of approximately 36 hours per year, (and two hours per week in the 8th grade), the textbooks set a series of complex and challenging objectives for teachers: the formation of attitudes, values and skills needed to understand the mechanisms that manage the

functioning of human society and the causality between natural phenomena. The structure of these educational dimensions is built by combining geo-ecological views and the formation of civic attitudes, responsibility and moral empathy towards nature. With regard to environmental issues, Romanian textbooks align with international trends that frequently present humans as a problem, not a solution (Standish, 2009), including too little emphasis on the positive visions about the present and on the overall social changes towards a sustainable future.

Structurally, the rote learning of information as a way of "memorizing the lesson" is seen as an outdated practice that limits critical thinking, suggesting what and how you should think. Thus, the adaptation of the most recent textbooks to the modernization of the teaching process is reflected by reducing texts length in favor of topic-specific investigations, often found in the margins of the pages, and exercises that target the formation of new digital geographic analysis skills. Also, the new reforms address the fundamental geography subjects by increasing the pupils' analytical independence, beginning from the understanding the local issues to their international extrapolation.

Starting from the premises of the new directions in geography teaching, digitalization and sustainability, this study aims to answer the following questions:

Q1: How up-to-date is the geography taught in Romanian schools and how unified is school geography from the 4th to the 12th grade?

Q2: Do the subject curricula manage to adapt to the new geographical realities?

Q3: How do the geography textbooks answer to the skills and concerns of the new generations of pupils?

1. Literature background

1.1. Understanding the digitalization path in the school geography

Recent global changes in innovation and technological advancement should be reflected in the rethinking of the education systems and adopting new curricula and syllabuses, adjusted to new realities in which digital information is increasingly accessible. The reforming implications of technological systems in geography teaching were first addressed in the 1980s by North American geographers, who questioned the importance of active learning and the stimulation of civic initiatives among pupils (Kemp et al., 1992, Nellis, 1994). Long before the mass production of the computers and the equipping of schools with digital technology, there was the question of

adopting new pedagogical methodologies, updated in accordance with the informational progress and creating spatial analysis software suitable for schools, quite bold visions at the time. GIS, defined as "Geographic Information System", consists of a series of software that mediate the visualization of digital information and facilitate the data analysis for various (geo)graphical studies, abilities which are considered a form of "geo-spatial literacy" (Miller, 2005). Thanks to the plurality of this field, in the early 1990s GIS was considered to develop fundamental skills for the contemporary society, such as processing and interpreting geographic data, essential to strengthen pupils' spatial connections with the world they live in. Although some critics have insisted on preserving the traditional style of teaching geography (Morrison, 1991), the increasing demand in the labor market for geo-spatial skills has enhanced the voices of the geographers who called for the elimination of the elitist nature of GIS, previously studied in academia, and its introduction into the school geography.

The digitization of geography curriculum and textbooks was a productive way to investigate and contextualize the contents from the geographic perspective of space (Gersmehl, 2014), the reciprocal relationships between geospheres, challenging pupils' reasoning to recognize and suggest solutions to current challenges in society. In the spirit of the rapid technologization of today's social architecture, the introduction of GIS in schools was seen as an effective way to encourage pupils to learn new analytical software and to approach geographical topics from a digital perspective, acquiring "XXIst century spatial thinking skills" (Kolvoord, 2021). Subsequently, this trend has been assimilated by other countries, such as Singapore (Yap, 2008), UK (Green, 2001) or The Netherlands (Bednarz, 2006), which have invested in 3 main areas: training GIS skills among teachers, installing the necessary equipment in schools and incorporating the teaching of GIS into the core curriculum. Over the last 20 years more and more countries have included the study of GIS and internet resources in their curricula, initially as a peripheral subject, and later to become the catalyst for new teaching techniques and data sources.

In the last decade, with the expansion of the internet access and the growing financial accessibility of the general population to personal electronic devices, the rhythm of everyday life of life has become dependent on them and more children nowadays have their own smartphones. Used correctly, they can be an effective teaching tool. On the other hand, the reshaping of the entire geographic teaching paradigms according to the new technologies and the official adoption by the education authorities around the world has

proven to be a laborious and time-consuming process. The bureaucratic delays manifested by teaching Google Maps, for example, to generations who had already been using the platform for a long time and had independently adjusted their spatial perceptions. However, school curricula have been (re)updated in an attempt to catch up with the technological advance by introducing both new teaching methods related to the use of GIS software and frequent insertions of specific terminology (GPS, Google Maps, internet, website) into the lessons' content and interactive exercises, solvable by digital methods.

However, GIS is not just about identifying locations and knowing GPS navigation applications, it is also about developing analytical, research and geographical thinking skills. Combined with the information from the textbooks, computer-assisted teaching increases the effectiveness assimilating the topics and pupils' attention span (Lam et al., 2009). In schools where GIS is frequently integrated, pupils study the processes of collecting, editing and analyzing databases (Kerski et al., 2013). By stimulating the constructive way of teaching, GIS focuses on the creativity and spatial thinking abilities of the pupils, who are given the freedom of analytical expression on geographic topics.

Nowadays, GIS is still not widely adopted in the geography classes (Bednarz et al., 2006, Artvintili et al., 2014). In countries where the study of GIS has been part of the geography curricula for at least 15-20 years, there are still a number of implementation challenges (a similar situation in Romania as well). The modest progress in the integration of GIS technologies in school education can be explained by a combination of institutional, curricular and pedagogical factors. Firstly, GIS learning is dependent on the schools' technical equipment, GIS programs and access to geospatial databases. The introduction of GIS is often hampered by the expensive software licenses (Bednarz et al., 2006), but, in some countries, data acquisition is mediated by partnerships with the public institutions and through training programs and didactic support sponsored by various organizations (Lázaro et al., 2007). But in most of the schools, due to high costs, almost all GIS lessons are based on the use of free programs and the study of digital cartography still remains frozen in the conventional system, limited to the navigation and visualization.

The last constraining factor, the issue of the teachers' training, is influenced mainly by the (lack of) teaching materials. Studies show that some teachers are unsure on how they should introduce the use of digital resources into their discourse (Lázaro et al., 2007) or the usefulness of the internet into their teaching discourse and question whether their role is diminishing.

Undoubtedly, they are aware of the complexity regarding the possibilities of visualization and interpretation of GIS applications (Yap, 2008), but some point out the danger of over-modernizing the subject by over-individualizing the teaching-learning process (Bindea, 2014), which can negatively influence the hierarchical relationships. In other countries the integration of GIS into geography classes is hampered by the underfunded budgets: for example, in the UK (Bednarz, 2006) the programs for the teacher training in GIS are insufficient and their depends on the school resources. Also, some of the teachers have little or no training in computer skills, thereby preserving the traditional way of teaching. In contrast, those who routinely teach (with) GIS recognize the higher degree of difficulty in organizing and lecturing these lessons, which require more preparation time and individual attention to guide each pupil (Yap, 2008, Lam et al., 2009). Not the least, the lack of teaching support with clear instructions on GIS topics (Lázaro et al., 2007) which would encourage the normalization of the innovative teaching methods, are the most common obstacles geography teachers face. Where chronic underfunding of training programs, high software purchase costs, and time-constrained teachers intersect, one of the quick-impact solutions for expanding GIS teaching would be the free availability of pre-recorded courses and materials (Kerski et al., 2003, Kidman, 2018).

1.2. The role of sustainability in the education policy agendas

Due to the integration of the physical and social sciences, geography can be considered the science of sustainability. Studying the interactions between the environment and society offers the advantage of a holistic insight into the spectrum of causal relationships that determine disruptions to the planetary balance. Geography taught in schools plays an essential role in understanding the mechanisms that shape the global changes, such as political conflicts, extreme weather events or the unequal distribution and competition for natural resources. Essentially, thinking geographically means understanding the responsibility of nature protection, more deeply than just using a cardboard straw instead of a plastic one. The "geo-literacy" of society (Meadows, 2020), beyond the memorization of geographical curiosities, extends to a comprehensive awareness of the humans' (self) destructive actions on the planet. It has been a long-standing process, energized by the recent large-scale natural disasters such as the Chernobyl explosion or by the expansion of the Antarctic Ozone Hole.

The scale and frequency of the potentially devastating phenomena on the human life over the last few decades has raised the level of global alert and brought into focus the issue of the (future) human-nature relationships. Preventing natural and man-made disasters has become a top priority on the political agendas of the world's nations. Protecting nature, in a broad sense,

turned into a matter of national security that could only be guaranteed through international cooperation. In the last 30 years, the official expression of actions for protecting the living world has been the ratified international conventions on environmental issues such as the one in Rio de Janeiro (1992), Kyoto (1997), Copenhagen (2009) or Paris (2016) (Wood, 2019). Overall, these agreements imply policy reforms aimed at creating community resilience plans against the climate change. In public opinion, this progressive paradigm shift has led to a conceptual broadening of human rights, by motivating the idea that the right to preserve the balance of nature means, in essence, securing the right to life and the future. With the emergence of this movement and the general increase of environmental awareness, the notion of "environmental citizenship" began to be mentioned much more frequently in the scientific literature. This defines the national, international and intergenerational environmental responsibilities of each individual that derive from principles of moral justice and equity (Dobson, 2003). As political leaders have yet to reach a unanimous international perspective on mitigating human impact on the environment (Meadows, 2020, Yli-Panula et al., 2019), the pressure needs to be reinforced from inside, by educating the new generations about the mechanisms by which a sustainable future can be built.

Naturally, in the heart of all the political and economic changes, school geography has reacted by updating the subjects taught according to the new paradigms. The spectrum of human-nature interactions, which is the core of the discipline, has been diversified with the topics about natural disasters, climate change or the overall impact of the Anthropocene on the (dis)balance of nature. Certainly, discussing these matters without questioning the sustainability and morality of human actions would be incomplete, making geography textbooks "promote" sustainable thinking in classrooms long before it became fashionable. At the beginning of the 21st century, the international organizations adopted a series of statements of recommended actions (Schee, 2012), advocating the introduction of the sustainable development principles and practices into the school curriculum. Certain authors believe that the serious environmental problems of the recent decades have fueled a sense of "environmental anxiety" and urged the inclusion of education for sustainability in schools (Yli-Panula et al., 2019). Presently, the most discussed sustainability topics include changing the resource consumption behavior towards a sustainable model and reducing pollution (including land degradation, climate change, poverty and social injustice), as well as promoting peace and respecting human rights.

On the other hand, the engagement of pupils regarding the imperative of adapting the whole social and economic organization according to the principles of sustainable development creates a series of dissonances. Some

studies show that 21st century pupils tend to become detached from the environmental issues (Wood, 2019). It is easier for today's generation to pass the responsibility for the environmental degradation and the need for environment protection to the authorities than to question their own impact. Still, there are young individuals who are actively involved in the sustainability crisis, but are aware that the decision-making power does not belong to them, and, as a result, the moral responsibility ultimately still lies with the authorities.

Today, sustainable development themes are well integrated into school geography in most of the countries as ecological, economic and social sustainability. The most subtle differences can be found in the frequency with which the topics are addressed and their (lack of) appearance in the official curricula. For example, the lesson contents that discuss the problems of pollution, desertification or the reduction of biodiversity are commonly covered in Spain, although the subject of sustainability is not explicitly mentioned in the curricula, leaving it up to the teachers' decision (Sánchez, 2011). On the other hand, the relatively newness of the subject and its apparent lack of relevance compared to other disciplines places the sustainability discussions in some Asian countries somewhere on the edge of thematic priorities for both pupils and teachers. The pressure of the intense preparation only for the exam disciplines is built up early and sacrificing geography classes in for mathematics or foreign languages is a widely accepted practice (Zhou, 2020, Sung et al., 2022). In these conditions, the teaching of these concepts is quite limited, even if the geography curricula have been reformed in this respect. Additionally, in the curricula where the issue of sustainability is given more time in the pupils' timetables, the textbooks mainly focus on the descriptions of the negative impact of the human activities on the environment, but the efforts directed towards remedying the effects of degradation are presented in a passive manner. Most of the time the suggestions on how each pupil's family could become more sustainable are not mentioned nominally, but rather by generalized conceptual ideas (Bednarz et al., 2007). The experiences of other countries in implementing education on sustainable development in the school curricula and textbooks show that these issues still have a long way to go, from being pushed higher up on the timetable priority list to overcoming ethical barriers (it is not someone else's responsibility, it is (also) mine). Although limited by a lot of constraining factors, the general purpose of the geography textbooks underpins the construction of visions about the (in) effectiveness of current sustainability policies and challenges pupils to critically examine the quality of the future by the actions taken today.

2. Methodology

2.1. Context and data collection

The analysis of the conceptual trends of geography in the Romanian school education requires, on the one hand, an examination of the legal framework of the discipline, represented by the current school curricula, and, secondly, the school textbooks, written to comply with the official syllabuses. This study is based on the research of these materials taking into account all the 33 textbooks, approved by the Ministry of Education, from 4th to the 12th grade (NCPEE, 2023). Regarding the school curriculum, it should be noted that the specific competencies have a generalized construction, giving an increased degree of freedom to authors and teachers who can determine the level of complexity and detail of the content. For example, in the 7th grade curriculum (MER, 2017), among the subjects on sustainability, there are indicated specific competences such as "*presentation of examples of good practice/initiatives on sustainable development*", and in the 6th grade, referring to the teaching of information technologies, it is mentioned, in a more generalized formulation, "*the characterization of geographical elements, phenomena and processes using GIS techniques*". The extent of difficulty and interpretation of this type of tasks is reflected differently in each textbook, even if it is for the same class. Therefore, in order to investigate in an unbiased way, the alignment level of the school geography in the Romanian curriculum with the international trends, this analysis investigates the contents of the acts that formalize what and how geography is taught (school curricula) and the main teaching materials (textbooks).

2.2. School curricula

The school curriculum is the official document that legalizes the subjects, competences and educational approaches of the topics considered important for the identity construction of the new generations. Broadly speaking, it sets out the essential information to be assimilated and what is considered most relevant to be learned. The analysis of these documents is the first step in setting the educational priorities of the system, reflecting, in turn, the political mindset and socio-economic context of the geographical issues considered a priority at the beginning of the 21st century. Their structure follows a logical thread of knowledge and gradual extension of the local horizon, while developing the spatial and scale perception of the simultaneous reality. The construction of these skills is mediated, as early as the elementary school, through the use of electronic devices, which are an important element of the curricula modernization and are constantly mentioned in all syllabuses,

but implemented in a more complex way in the recent textbooks (those edited after 2018), following with the accelerated digitization of society in recent years.

Firstly, the main analytical objectives focused on identifying the objectives and values related to GIS, information technologies and sustainability in the structure of the school curricula in the targeted competences. These have been extracted and presented in Table 1; most of the time they are mentioned as separate skills, but in some of them the formulation is generalized and can be considered interleaved. In addition, the diversity of perspectives and the frequency of the incorporation of these directions has been taken into account. Furthermore, the school geography curricula include methods of building the national geographical identity, consolidated throughout the school years. These are systematized through the environmental education (respect for nature, protection of fauna and flora), exploration, involving the digital navigation and the nurture of responsible attitudes towards the community and environment. Through a simple inventory of terms and the analysis of their contexts, the geography curricula mirror the adaptability of specific skills in relation to the digital capabilities of the children born in the age of technology and also in a complicated geopolitical period, with complex environmental problems for which there are no simple or quick solutions. Overall, they reflect the degree to which the doctrines of the education system are in synchrony with the current priorities of protecting the planet and educating the new generations to be resilient to the future.

Table 1 *The structuring of the curriculum content and textbooks*

Grade	Curriculum implementation	Nr of textbooks	General and specific skills in the areas of GIS & information technologies / Sustainability & sustainable development
4th grade	12/2/2014	9 textbooks, edited in 2021 and 2022	– Develop the curiosity to understand the geographical features of the local horizon, the country and the contemporary world. – Acquire an interest in understanding the role of the environment for the life and activity of society.
5th – 8th grade	2/28/2017	8 textbooks, edited in 2022;	*5th grade:* – Use the map/ground orientation techniques. – Describe geographical features, phenomena and processes using concepts from mathematics, science and technology. – Make connections between the geographical reality and phenomena in science and technology.
		1 textbook, edited in 2018;	*6th grade:* – Use the geographical information obtained with ICT/GIS tools and elements of mathematics and science. – Present of characteristics of geographical features, phenomena and processes using GIS tools. – Describe local, national, European and world heritage using various sources.
		3 textbooks, edited in 2019	*7th grade:* – Conduct projects/case studies using GIS tools. – Explain the relationships between groups of elements, phenomena and processes of the environment. – Identify solutions to protect the environment.
		3 textbooks, edited in 2020	*8th grade:* – Build graphical and cartographic representations based on data and/or given media. – Explain geographical features, phenomena and processes using mathematical, scientific and GIS concepts. – Identify solutions for the protection of the environment in the local or remote horizon in the context of the sustainable development.
9th grade	3/9/2004	1 textbook, edited in 2008	– Form a constructive critical behavior in relation to the qualitative elements of the environment.
10th grade	8/13/2004	2 textbooks, edited in 2005 and 2007	– Analyse of the interactions between the environment and the population. – Identify sequences of social and economic phenomena and processes.
11th grade	2/13/2006	2 textbooks, edited in 2006 and 2014	– Explain the observable relationships between science, technology, population, resources and development by analyzing the territorial systems and structures. – Elaborate of territorial development projects.
12th grade	2/22/2006	4 textbooks, edited in 2007, 2008 and 2012	– Explain the natural processes in the (geographic) environment at the continental level through connections suggested by the analysis of graphical, cartographic and images. – Formulate problems related to regionalization and globalization from a European perspective, using the correct terminology specific to the field.

2.3. School textbooks

The analysis on the topicality of the discourses in geography textbooks regarding the two educational perspectives of the last decades is carried out by examining the whole content: text, exercises, homework assignments, topic-related investigations, analyses. The textbooks are the publications of specialized geographers in the field of developing teaching materials for school geography and most of them have coordinated geography textbooks corresponding to several grades (Octavian Mândruț, Silviu Negruț, Cristina Moldovan, Mihaela Fiscutean). As regards their timeliness, there is a gap of 17 years, from the oldest one, edited in 2004, to the most recent, published in 2022 (for the 4th and 5th grades) (NCPEE, 2023). A series of textbooks have been (re)published in the last 2-5 years, but keeping the same content, and the first editions are usually published immediately after the approval of the curriculum (in the 10th grade the curriculum was approved in 2004 and the textbook dates from 2005) (MER, 2004b). The only major discrepancies that highlight their moral wear can be found in the secondary cycle, within the geopolitics chapters. The most eloquent example are the two 10th grade textbooks, published in 2005 and 2007, where Romania is an EU member, obviously only in the second one. Obviously, geopolitical formations are not the subject of this research, but the informational paucity of the high school textbooks that have not been updated for almost two decades is useful in order to compare the (non)existence in 2004 / 2006 of the discussions about contemporary topics and methodologies of geography (information technologies, internet, sustainable development or their combination). For certain grades, teachers and students have several textbooks available (including online) (Table 1), and are free to choose just one throughout the school year, or use them together, in order to optimize the assimilation of the subjects, which are approached differently, in terms of content density and variety of exercises. The structure of the textbooks has been designed to teach the general areas of geography in an accessible way, according to the pupils' level of intellectual development: human geography, physics, geopolitics, general elements of astronomy and cartography at three scales, planetary, continental (European), national and local.

For each of the two dimensions listed above, a range of terms have been analyzed that are the foundation of the modern construction of the discipline of geography. The study applies two methodological perspectives: the quantitative approach (number of concepts and derived terms) and the qualitative approach (context and content messages). In this respect, the topical directions of geography are interlinked, either directly (exercises, cartograms, maps, case-problems, practical observations) or indirectly (within the theoretical discourse). For example, the use of digital maps is valorized in

cartography, hydrography and geomorphology, and individual and community sustainability has both international and local implications. As textbooks are reflections of the dominant culture and usually reflect its aspirations and prejudices, this study aims to identify how and to what stage the legal framework of Romanian school geography keeps up with the modernization of international school geography.

2.4. Data analysis

The most exhaustive analysis technique was chosen for the data research: browsing the content of the textbooks and identifying both the variety and frequency of the key terms related to the topics covered (Table 2). In addition, the system of values and attitudes conveyed by the contexts of the messages in which they are used was considered equally relevant. The examination of the texts and the selection of keywords and phrases is divided into two parts:

a) *Information technologies and GIS* - mean the totality of terms that defining technology, new methods of communication, visualization and individual research involving digital resources and connection.

b) *Sustainability and Sustainable Development* - include the corresponding terms that explain and from which the values of these concepts derive, as well as those that represent the very purpose of the paradigms themselves.

Table 2. Words and syntagms related to the two teaching directions

Information technologies and GIS	**Sustainability and Sustainable Development**
Digital platforms / applications:	*Resources:*
– GIS – Google (Maps) / OpenStreetMap – Google Earth – Street View	– natural resources – natural environment – ecosystem – exploitation (of resources)
Digital resources:	*Negative impact:*
– Internet – www. / https:// – GPS – Satellite/digital maps	– pollution – environmental degradation – deforestation – anthropization
Devices:	*Positive impact:*
– phone – computer / laptop / desktop / tablet	– sustainability – sustainable development – recycling – environmental protection – quality of life

In the first stage, the analysis of keywords involved eliminating those used for editorial purposes and calculating the arithmetic average of the frequency of terms in the grades that have more than one textbook, divided into three categories: content, exercises and analysis. At the same time, the processing of all terms involved examination of:

- the frequency of terms in relation to the scale of reference: local, national, international;
- the positive or repulsive context of the keywords in terms of sustainability;
- the level of encouragement for independent use of specific electronic devices.
- the extent of the emphasis on environmental issues and short- and medium-term solutions.

For a complete analysis, the most frequently used terms were selected together with the words and phrases in Table 2. In total, 15 unique terms (including grammatical declinations) were identified for the Information Technology and GIS group and 14 terms for Sustainability and Sustainable Development. These were ranked according to the frequency of occurrence in the textbooks of each school period and the most related adjacent terms (Fig. 2, Fig. 4).

3. Results

3.1. GIS and digitalization in school geography

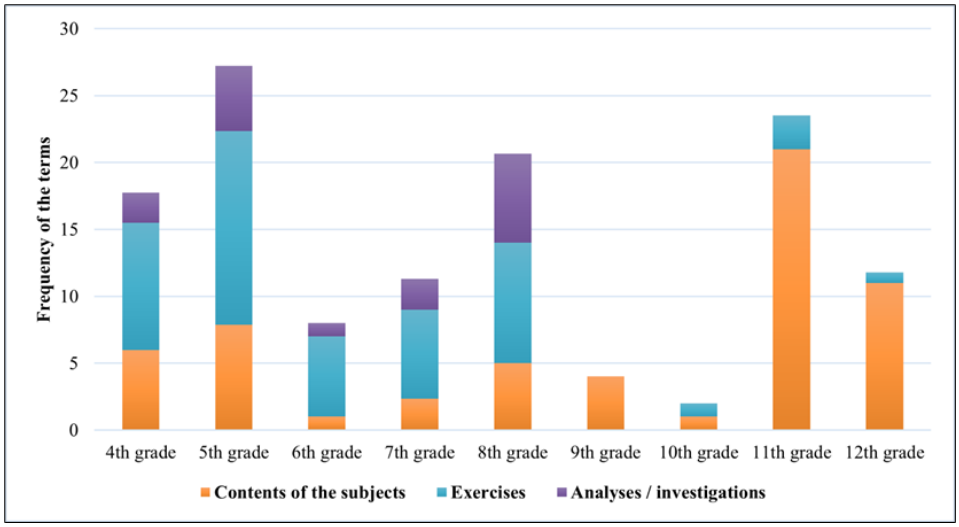
In elementary school, the earliest intentions on the alignment of geography in Romania with international trends materialized in 2014, with the approval of the new geography curricula for the 4th grade, where the first specific competences involving the use of the internet are expressed: "*exploring new and alternative sources of information to broaden the horizon of knowledge*" (MER, 2014). Needless to say, the introduction of GIS applications in the curricula of 4th grade children would be premature, hence, the theoretical discourses and the numerous exercises (Fig. 1) focus on multiple suggestions to consult websites for additional information. Their structure gives a high degree of autonomy to pupils through numerous individualizable assignments to which there can be no identical answers and which are intended to stimulate their spatial curiosity (e.g.*identify the landforms encountered on the way to their grandparents*) or require longer-term research (e.g. *record weather parameters over a week*). Clearly, the structuring of the subject matter by including multiple internet-related tasks is tailored to the general digital capabilities of today's elementary school-age pupils. However, they are designed for schools with computers and internet access and for children with modern electronic devices. This approach is based on the idea that at this age (9-10 years) children have generally already formed sufficient internet browsing skills and know how to use the most popular mobile phone applications for spatial orientation and

search engines, such as Google or Google Maps (Fig. 2A), therefore their understanding of the basics of how new technologies work represents an advantage in geography classes from the very beginning. During this stage the tasks encourage the efficient use of the internet, exploring the local horizon and expanding the boundaries of knowledge. The purposes of the exercises (Fig. 1) are to identify distinct features of the relief and develop spatial awareness through a concentric sequencing: connecting the home place to the level of the country, connecting Romania to the European continent and Europe to the planetary scale.

In the middle school cycle, the latest curriculum for the 5th - 8th grades was adopted in 2017 and the latest update introduces the new GIS elements. Prior to this, the initial references to consulting digital resources are found in the 2009 school curricula, which laid the foundations for the development of computer skills through the use of the internet for consultation purposes (searching, copying and presenting additional information from web), curiosities and geographical superlatives about European countries, continents and their regions.

Figure 1

Frequency of terms related to information technology and GIS, by grades and categories.

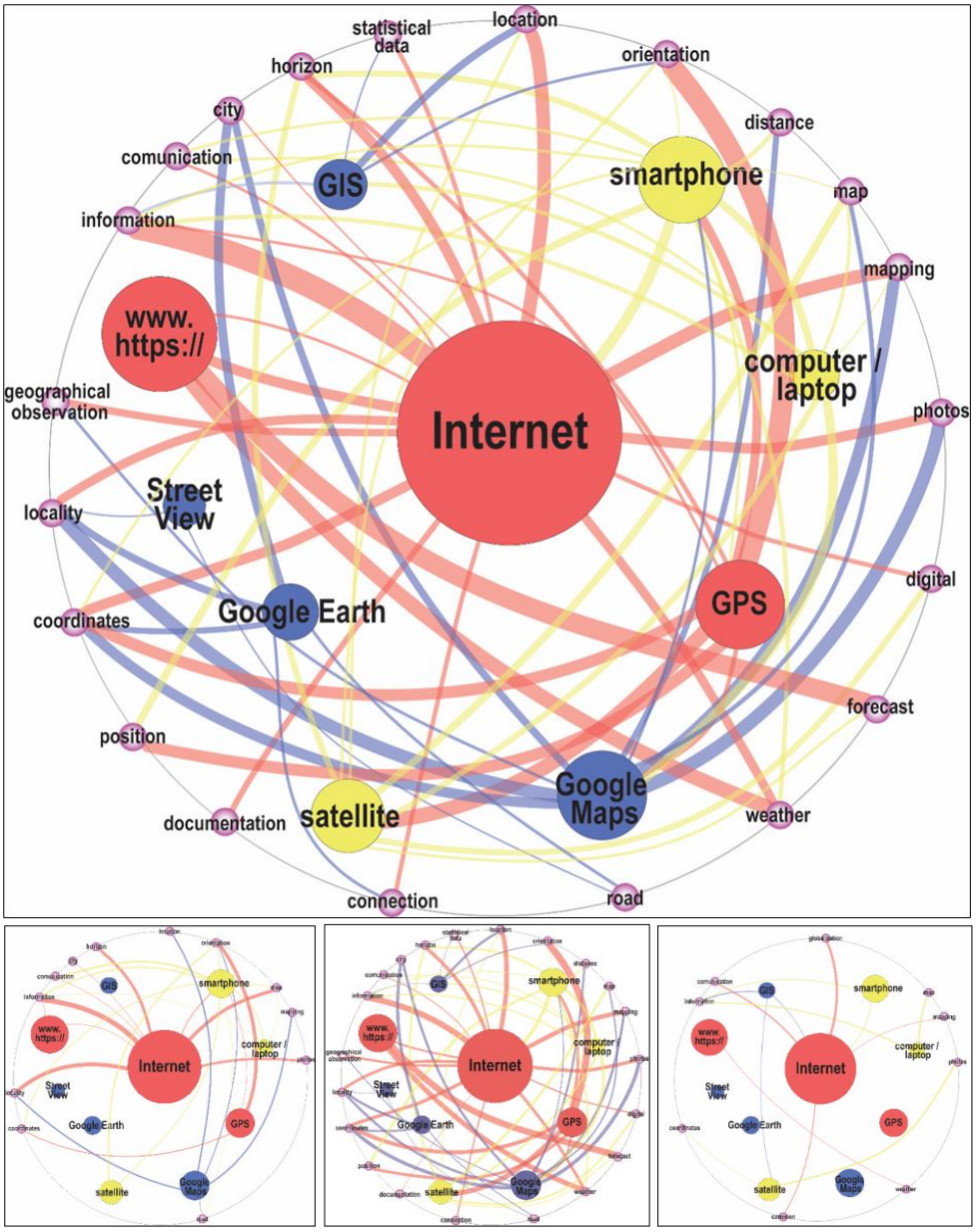


The 2017 curriculum includes new additions in the area of GIS technologies and applications from 5th grade, despite keeping the descriptive style of the 4th grade. The increase in complexity is reflected in the large number of exercises that involve critical analysis and complex investigative approaches from multiple sources (e.g., *identify the causes, cyclicity, and preventative measures of the extreme natural phenomena in the locality or investigate how global climate*

change is affecting glaciers and the Arctic ice pack). Additionally, there is a frequent interspersing ofexercises involving the use of the most popular digital visualization tools of the digital platforms (Google Street View, Google Earth, Open Street Map). The digital tasks are also intended both for routine classroom activities (which can be solved quickly using the phone) and as homework, and focus on describing geographical phenomena using navigation applications, exploring cartographic representation typologies (satellite images, topographic images) or identifying terrain features in the local horizon (Fig. 2B). In addition, the field applications continuously encourage independent or group field excursions for studying the natural and anthropic features of the local area (e.g.*lakes, drinking water sources, tourist attractions, special landforms*).

In the 6th grade the exercises requiring the use of navigation applications are focused on the exploration of the functionality and mathematical transformations of graphical and numerical scales, while in the following year the digital competencies return to a rudimentary level in some textbooks: describing geographical elements and processes, writing summary texts or completing sentences containing geographical curiosities with information from various sources (including internet). In contrast, the last middle-school class (Geography of Romania) presents the most exhaustive and complex case studies and investigations (Fig. 1) concerning issues of national importance (e.g.*the general population decline or the exploitation of renewable energy sources in Romania*) and combines the consultation of official data sources with the development of argumentative texts on causal relationships and the identification of potential future forecasts. The textbooks show a limited incidence of exercises involving searching for information from web sources, but incorporate more sophisticated geographical problems and solutions, combining the flexibility of digital knowledge accumulated from previous years. Often, the case studies indirectly invite pupils to independently consult the internet in order to develop their arguments about a particular topic of national importance, which may be presented briefly in the textbook, but be interesting enough to excite their curiosity. Thus, the aim is to sharpen the critical sense, the spatial awareness and abstract thinking skills, which are indispensable for training individuals who use the internet and GIS platforms in an informed and responsible way, being able to provide informed explanations of the substrate of geographical issues both from the directly and indirectly perceived reality.

Figure 2 *Word occurrence network related to GIS and information technologies, all 33 textbooks* ***(A)****, elementary-school textbooks (4th grade)* ***(B),*** *middle-school textbooks (5-8th grades)* ***(C)*** *and high-school textbooks (9-12th grades)* ***(D).***



The high school geography curricula (9th - 12th grades), adopted in 2004 and 2006, form a psychological rift of contents and competences for over 10 years. Thus, looking at the whole pathway from the beginning of the study of geography as a separate subject, from 4th to the 8th grade, a natural, there is an ascending trajectory of the development of digital knowledge, from the simplest tasks to complex analysis and investigations. These take the form of interactive exercises, but also by directly informing pupils about useful official data sources concerning the planet, rainfall, earthquakes, pollution or international cooperation organizations. In addition, in the elementary and middle school the textbooks provide plenty of suggestions for self-exploration of additional information on the subjects taught in class, so that by the 8th grade pupils will have developed a variety of different digital skills. Due to the non-updated high school curriculum, the 5-year geography digital journey is interrupted in 9th grade as the textbooks are "disconnected" from the logical continuity of the discussions about internet and GIS technologies (MER, MER, 2004a, NCPEE, 2023). First of all, in 2023 high school students are still learning from textbooks published before 2010 and only for 11th and 12th grades there are more up-to-date options. The theoretical discourses are frozen in time, unsuitable for today's teenagers simply because they relate to a school curriculum introduced before the global expansion of internet use and address the geographical subjects according to classical procedures such as long, descriptive texts. Needless to say, in 2004 and 2006, the internet is presented in textbooks as the intelligent communication resource of the future (Fig. 2C) on which the development of all technologies will rely. Under these circumstances, the exercises that should involve the interactive use of GIS platforms at a higher level than in secondary school are completely lacking and the few simplistic tasks referring to the search for curiosities on the internet (e.g.*search for the currencies of the European countries before Euro was adopted*) are reminiscent of the early years of the 21st century when owning a computer was equivalent to an elite social status. Therefore, in upper secondary school level, the integration of GIS teaching and the development of more complex digital skills for effective internet navigation outside the textbooks are dependent on the time availability and practical knowledge of the teachers, but, with no formal framework, the integration of contemporary teaching elements into geography lessons is highly unlikely.

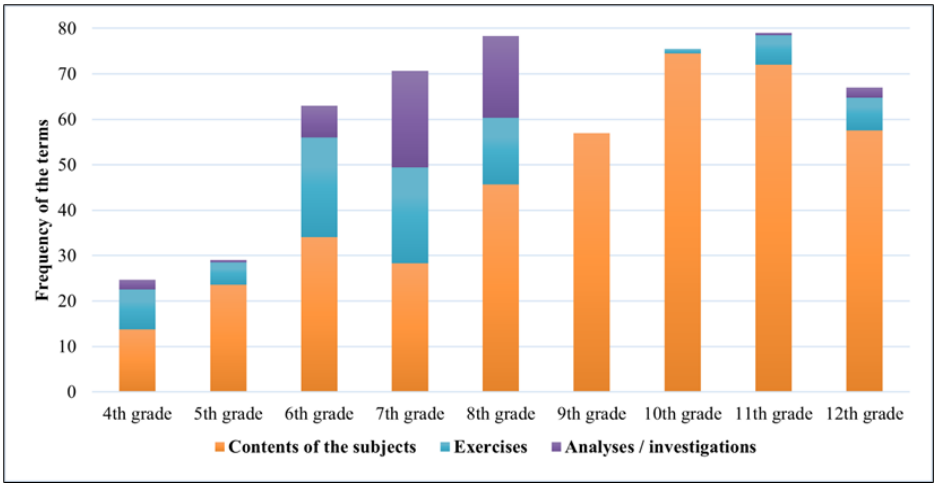
4.2 Sustainability and sustainable development in school geography

In Romanian school geography, the concepts of sustainability and sustainable development, as conceptual definitions, are introduced, according to the school curricula, not until the 6th grade. However, the environmental awareness is cultivated earlier, initially in the "Natural Sciences" classes in the 3rd grade. During the following year, once the discipline of geography is introduced, the pupils are familiarized with the most commonly used concepts about the responsibility of sustainability in a simplistic manner, adapted to their level of comprehension of the terms:*environment, (exploitation of) natural*

resources or *the diversity of nature*. According to the syllabus, the skills of "*understanding the need to protect the living environment [...], knowledge and conservation of the environment*" are reinforced in the geography of the 4th grade. Although the concept of sustainable development appears much later in the textbooks, in the elementary school it is approached through the lens of environmental and ecological education. For 9-10-year-olds, some of the most important emphases are the development of civic awareness in relation to learning to protect nature and adopting a responsible behavior during trips in the forest or in mountain areas. Suitable suggestive mechanisms of this age of building respect for biodiversity are the straightforward approaches to identifying and solving simple environmental problems in the pupils' local horizon (hometown, school surroundings) and also in natural regions of national importance, vulnerable to human activities (Danube Delta). In order to encourage these eco-social behaviors in the long term, several textbooks show images of non-anthropized fauna and flora, in antagonism with others depicting river, air pollution or the negative effects of deforestation, both in the lesson discourse and within exercises that stimulate visual, spatial and analytical reasoning (Fig. 3). On the other hand, out of the 9 textbooks available for the 4th grade, only 4 of them mention a couple of times the term "*pollution*" and "*recycling*", only once. Potential solutions to combat pollution vary from exercises and suggestions for group environmental actions (e.g.*planting seedlings in a forest, sanitizing a river area*) to simple investigations and individual projects (posters) about sources of pollution and environmental alternatives in the neighborhood (e.g. *think about how the environmental quality of our community canbe improved*).

Figure 3

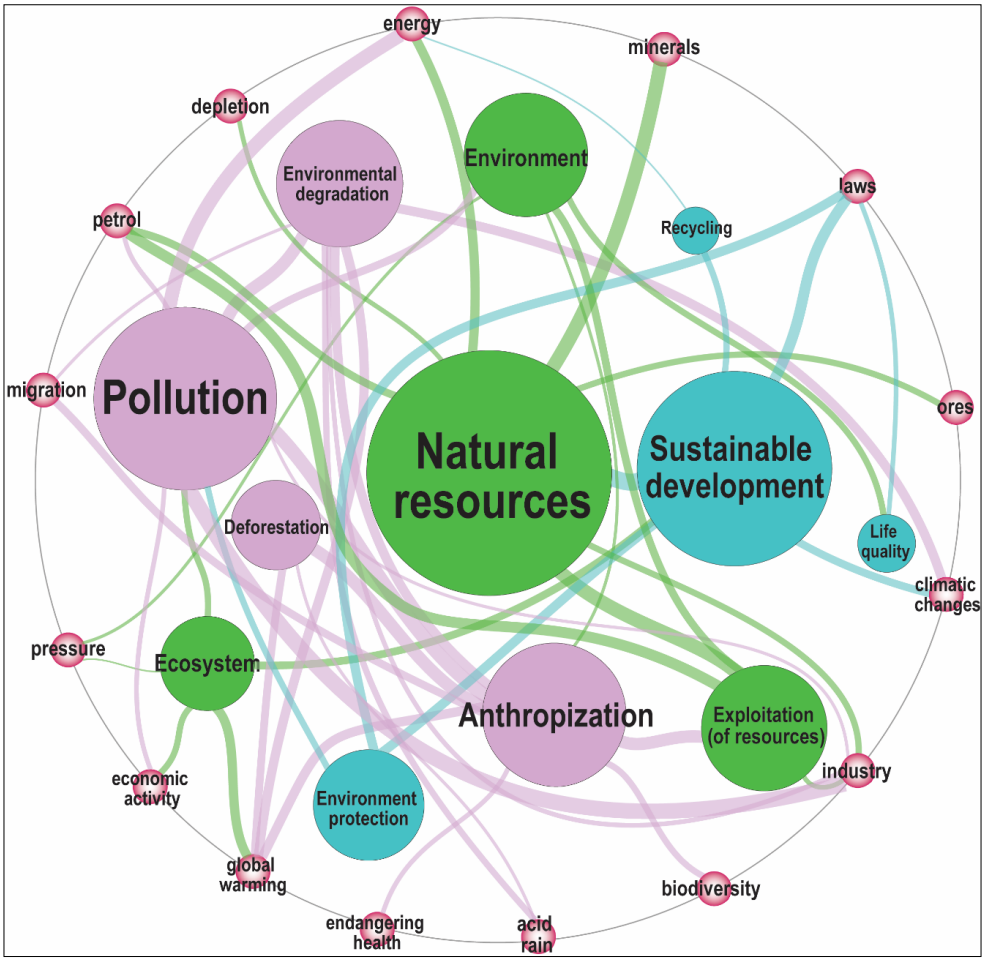
Frequency of terms related to sustainability and sustainable development by grades and categories



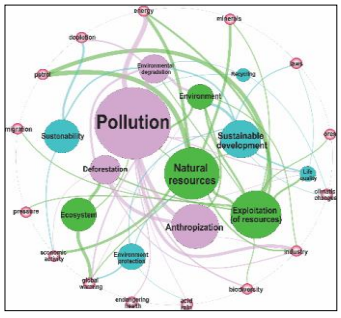
The geography of sustainability at the beginning of middle-school cycle maintains the same normative directions: identifying local environmental problems and proposing solutions. In 5th grade, the gradual stimulation of analytical thinking on sustainability issues is a marginal and indirect objective, since the main parameters donot differ substantially from the contents of the elementary school: *scale* (local horizon: the neighborhood and the school surroundings), *subjects* (water, air, soil and forest pollution) and *suggested imperatives* (protection of the natural environment, selective waste management). At the same time, the curriculum does not explicitly mention new competences aimed at environmental education, but specifies a series of elements with general validity and applicability, which can be extended to the protection and conservation of the nature, such as "*draw up a project plan for solvinga geographical problem*". In this sense, this formulation gives flexibility in the interpretation of the expression "*geographical problem*".

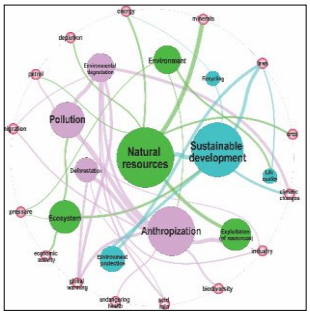
Therefore, as the content subjects in 5th grade include the study of the Earth's geospheres, the most relevant "geographical problems" are those related to the degradation, conservation and protection of the environment. The subject of pollution of the environment (water, atmosphere, soil) is covered in within the exercises andsituational problem sections as part of the majority of the lessons. It becomes the central reference point around which the issue of environmental protection and sustainability of the middle school geography gravitates (Fig. 4B). Within the topic of "*pollution*", in addition to the conceptual descriptions in the texts, three directions of long-term, customizable environmental responsibility were identified: a)involvement in campaigns to environmentalize pollution-affected areas in the immediate vicinity, learning about the long-term importance of correct disposal, sorting and recycling of household waste, at home and in the community, c) focusingon tangible actions, achievable by daily habits, which can minimize the waste of resources. The last aspect represents a new element of individual awareness-raising among pupils, present onlyin a few textbooks, supported by the amplifying effect of statistical data (e.g.*did you know that reducing shower time by one minute can save up to 170 liters of water per month?*)

Figure *4.* *Word occurrence network related to sustainability and sustainable development, all 33 textbooks* ***(A)****, elementary-school textbooks (4th grade)* ***(B)****, middle-school textbooks (5-8th grades)* ***(C)*** *and high-school textbooks (9-12th grades)* ***(D).***









As mentioned above, the concepts of sustainable development and quality of life are introduced for the first time in the 6th grade, although they are mentioned in the curriculum in the following year. The curricular competences which aim at strengthening sustainable values and practices are similar to those of the previous years: "*proposing measures/solutions for the conservation and protection of the diversity of local heritage, [...] for the formation of civic attitudes and behaviors*" (MER, 2017). The need to adopt sustainable development is explained in the light of the negative impact of human activities towards the environment, which manifests in an uncontrolled level of pollution, crises in the natural resource management, factors that endanger the quality of life. The discourse casts a negative light on the pollution-causing economic activities on which the entire functioning of the world architecture is based. The discourses highlight the destructive behaviors that human society has taken upon itself, irresponsibly using the planet's resources with very little regard for other living beings and their ecosystems. This calls into question the (in) effectiveness of current biodiversity conservation methods. Therefore, the solutions to avoid the pessimistic scenarios are based on the immediate global and individual adoption of sustainable development principles. The importance of sustainable alternatives in such fields as energy, transportation or natural resource exploitation is reflected both by the increased risk of compromising future generations if the engines of the world economy were to continue to operate at current parameters, along with the intrinsic desire to optimize the current living standards. The textbook provides two examples of sustainable development: the use of renewable energy resources and the smart city concept. Based on these ideas, pupils are offered a series of exercises and analyses to discuss the challenges of sustainable development and the actions needed to develop their home town in a sustainable way, minimizing the human impact on the environment and making more efficient their long-term resource consumption.

Most of the problems of environmental degradation, with negative effects on human society and natural habitats and require the development of durable strategies, often dependent on international cooperation, are further analyzed in the 7th grade. The issue of environmental degradation, extensively covered in a dedicated chapter, balances the negative aspects of human activities with potential solutions, formulated in a holistic manner and places the liability in the hands of political decision-makers. Yet, the wording of the texts implies that they are unlikely to be applied on a global scale (e.g.*combating food waste through the sustainable nutrition, promoting sustainable industrialization, access to sustainable and modern energy*). The textbooks analyze the complexity of this matter from both the perspective its political popularity and also of the rarely

assumed individual responsibility of the self-centered behavior towards nature.

Collective moral guilt (exemplified by topics such as the accelerating growth of the planet's population and the demographic and economic pressure on the land) is a controversial nuance of analysis. Fortunately, the core of pollution issues is discussed without the reticence of political correctness: the central ideas are that humans are the key problem of the rapid destruction of the planet, of the climate change, in particular the contemporary society, which has in the last centuries, in the name of the economy, created major threats to both human existence and the whole living world. However, there is still (!) time to change this apocalyptic trajectory through sustainable actions. These are not explained simply in terms of a purely geographical theory, but portrayed as a global resolution, thanks to a consensus of the majority of the world's nations, which have adopted measures with specific objectives on protecting nature, combating the devastating impact of natural hazards, often induced by human activities, ensure food security and generally improve the living conditions.

On a local scale, the curriculum for 7th grade maintains the stimulation of pupils' social involvement through personal initiatives on sustainable solutions and independent case studies regarding global environmental problems, starting from influencing their own community. The textbooks are adapted with tasks that deviate from the classical pattern of memorization and reproduction of the information, proposing numerous multi-directional investigations of medium complexity (Fig. 3). These typologies of analysis boost environmental empathy and awareness of the most pressing ecological changes in the contemporary world that affect the entire planet, not only the territories close to Romania, with which it may be more difficult to relate, in the context of expanding both spatial horizon and time scale consciousness (e.g. *propose a change whereby local councilors could transform the environment into a more sustainable one, or deliver a speech to the local authorities about how global warming affects the lives of schoolchildren*). Protecting nature in one's native place is therefore essential, as preserving the environment relies on the responsibility of each individual (e.g.*with the help of the internet, find out what is an ecological footprint and calculate it*). Through community commitments, small, individual actions can make a difference to the big climate and environmental challenges of today's world.

In the 8th grade the curriculum contains a series punctual competences related to sustainability and sustainable development (e.g. *presenting a scenario of a sustainable development project in Romania or explaining the links between human*

actions and the consequences for sustainable development), and their formulation underpins the introduction of plenty of exercises and case studies that require and enhance a deeper understanding skills of environmental issues concerning society as a whole, beyond the borders of the country. At this level, the subject of sustainability keeps the focus on the debates about global interventions for sustainable development, adopted during international conventions. At the same time, the steps taken by Romania towards this direction are discussed (the contents cover the Geography of Romania), through the Romania's National Sustainable Development Strategy 2030. Broadly speaking, the actions for sustainable development in Romania are summarized by the textbooks in 5 viewpoints: *administration* (the creation of metropolitan areas that would increase the economic sustainability of cities), *society* (increasing the quality of life, eradicating the poverty), *energy* (harnessing green energy resources, in the context of the decreasing exploitation of the fossil resources after the transition to a capitalist economy in the early 1990s), *tourism* (supporting the sustainable and ecological tourism that provides jobs and preserve the cultural diversity) and *agriculture* (shift from the intensive to ecological agriculture and the responsible use of water resources). On the contrary, the problematic aspects of current sustainable policies, which are differentially integrated in the territory, are being criticized in terms of the shortcomings in ensuring internal and external connectivity which are holding back the durable and equitable development of in and between the areas of the country.

In the high school cycle, with the oldest curricula, the concept of sustainability is presented in relation to the importance of rational consumption of natural resources and mitigating the effects of pollution, which are the central terms of the subject (Fig. 4C). Being adapted according to the old syllables (MER, 2006a, 2006b), the textbooks concentrate these topics almost entirely into large texts (Fig. 3), with only a few additional exercises or investigations, which are focused mainly on enumeration, sentence completion or free-form texts. The discourses fully explore the facets of environmental degradation issues, conservation and protection policies which were current 15 years ago. The sustainable development measures are presented as indispensable actions that need to be internationally implemented, as soon as possible, because of the rapid destructive impact of human activities on the environment. These phenomena have reached uncontrollable proportions in the last century in terms of the interrelationship between biomes and they are analyzed in a differentiated, sequential way throughout the chapters covering the geospheres, environmental protection and society. The most frequently mentioned issues that require the

implementation of sustainable actions are not necessarily strictly about environmental conservation, but also include the fundamental needed changes of the negative aspects of human behavior in its relationship with nature, which often lead to an increased frequency of the unpredictable consequences on the environment: corruption, terrorism, xenophobia or private ownership of the natural resources. For example, the highly politicized subject of the imminence of global warming is extensively discussed in both the sub-chapters on atmospheric and water resources, and also addressed from a geopolitical perspective, as the recent climate changes have not succeeded in convincing all the world's nations to join their forces to fight the issues, mainly because of economic interests.

Poverty and hunger, blamed on the uncontrolled demographic growth and the agricultural (drought, deforestation), economic and political inability of some territories to support very large populations, are phenomena of global resonance, but are frequently treated as an individual responsibility. The health diseases caused by water, air and soil pollution are widely acknowledged throughout society, but at the same time, the world economy cannot be slowed down by them because the structural changes towards a greener future are rarely profitable business and quite time-consuming on a generational timescale.

Such dissonances (we know we need to be sustainable, but we can't because we have become accustomed to a non-sustainable system that provides comfort) are indirectly reflected throughout the textbooks, exemplified by human interactions with the Earth's resources (e.g.*mining, oil rigs, industrial fishing, deforestation*). The pessimistic approaches are rarely balanced by few timid descriptions of sustainable efforts that have yielded positive results: for example, the increasing use of renewable energy sources and investments in green technologies that are gaining popularity among entrepreneurs and civil society. Certainly, today's developed societies are making much more consistent progress towards sustainable development. Hopefully, the extent to which sustainability topics are addressed in high-school textbooks published in 2004 and 2006 are a clear reflection of the increase in the last two decades of the general public's awareness of the idea that being sustainable is first of all, a moral responsibility to ourselves.

4. Discussionsand recommendations

The analysis of this research aims to provide a radiography, through textbooks and school programs, of the manner and the speed at which the modernization of the geography discipline is proceeding. Without claiming to

be a definitive study, this paper confirms, overall, the topicality of Romanian syllabuses and textbooks, which are following the conceptual directions of international geography didactics. In terms of the two educational trends (digitization and sustainable development), they are well adapted according to thematic and methodological priorities in relation to the identity and ideological changes of geography both as a science and as a school discipline.

Given the increasingly frequent and early insertion of the new information technologies in children's daily lives, the inclusion of digitization elements of specific skills in the school curriculum was only a matter of time. However, due to the relative newness of this teaching and learning direction, the organization of the core didactic materials is far from being perfect. This situation leads to a number of necessary recommendations: firstly, in addition to the educational role they contain, the exercises referring to the use of web sources and spatial orientation platforms should keep the attention and stimulate the involvement of pupils during class, and, in order to increase the emphasis on the applied side of geography, a greater part of the learning time (memorizing the information from the texts) should be dedicated to practical exercises, individually solvable by the pupils. Secondly, the informational wear of high school textbooks is the most critical issue regarding the incorporation of digital learning contents. A new set of textbooks should therefore be adopted as soon as possible, which should include new ideas for digitalizing the work tasks through more advanced exercises in terms of using the internet and spatial navigation software.

As regards the second dimension of this study, the topic of sustainability and sustainable development, the recommendations are focused on two aspects: to include concrete suggestions through graphics or illustrations in all textbooks, starting from 4th grade, about individual sustainable education. Specifically, how the pupils could adopt, with little effort, a sustainable behavior at home, in the family and in the community, how their lifestyles can be adapted in order to reduce the consumption and environmental footprint (e.g.*encouraging the use of public transportation, consumption from local producers, selective recycling, practical tips for saving water, electricity*). In addition, in all geography textbooks the terms "recycling" and "quality of life" are rarely used, even though they belong to the conceptual core of sustainability and therefore should be introduced in the content of the subjects much more frequently. Furthermore, another recommendation concerns the development of a collective responsibility mindset towards environmental degradation and the duty to protect the environment. It is essential to change the general vision of the texts, from an accentuated negativity about pollution,

desertification, drought, etc. to a positive constructivism, meaning a systematic inclusion of individual solutions through the texts and exercises (e.g.*what can you do to avoid or reduce pollution / help the environment*). This kind of approach does not mean downplaying the importance of understanding the devastating effects of the global pollution, but rather it concentrates on shifting the focus from the "guilty" perspective to a pragmatic constructivism way of thinking.

Ultimately, the functional essence of school geography is to build the resilience and adaptability of future adults in the face of the ecological, economic and political challenges ahead. And, as these have always been part of everyday life, geography must teach them that they can change the future, and its directions depend exclusively on the social and ethical responsibility that is built on school desks.

References

Artvinli, E., & Abay, C. M. M. O. F. (2014). Dealing with GIS in geography curricula: comparing Portugal and Turkey,in *Innovative Learning Geography in Europe: New Challenges for the 21stCentury*, (pp. 121–140), Cambridge Scholars Publisher.

Bednarz, R. S., Petersen, J. F., & Bednarz, S. W. (2007). Geography and education for sustainable development in the United States: The need for educational resources. *Internationale Schulbuchforschung*, *29*(2), 171–184. http://www.jstor.org/stable/43056778

Bednarz, S. W., & Schee, J. V. D. (2006). Europe and the United States: The implementation of geographic information systems in secondary education in two contexts. *Technology, Pedagogy and Education, 15*(2), 191–205, https://doi.org/10.1080/14759390600769573

Biddulph, M., Lambert, D., Balderstone, D. (2015*). Learning to Teach Geography in the Secondary School: A companion to school experience*, (pp. 5–26), (3rd ed.), Routlege.

Bindea, F. G. (2014) Using TIC in Teaching the Lesson "The Transylvanian Plateau" [Utilizarea TIC în lecţia „Depresiunea colinară a Transilvaniei"] in *Contemporary trends in teaching and learning Geography* [Tendinţe actuale în predarea şi învăţarea geografiei], (pp 59–61), Presa Universitară Clujeană.

Dobson, A. (2003). *Environmental sustainability in liberal societies in citizenship and the environment*, (pp. 141–173), OUP, Oxford.

Gersmehl, P. (2014). *Teaching geography*. Guilford Publications.

Green, D. R. (2001). *GIS in school education: an introduction*, in: D. R. Green (Ed.) GIS: a sourcebook for schools, (pp. 1–25). Taylor & Francis

Kemp, K. K., Goodchild, M. F., & Dodson, R. F. (1992). Teaching GIS in geography. The *Professional geographer, 44*(2), 181–191, https://doi.org/10.1111/j.0033-0124.1992.00181.x

Kerski, J. J. (2003). The implementation and effectiveness of geographic information systems technology and methods in secondary education. *Journal of Geography, 102*(3), 128–137, https://doi.org/10.1080/00221340308978534

Kerski, J. J., Demirci, A., & Milson, A. J. (2013). The global landscape of GIS in secondary education. *Journal of Geography, 112*(6), 232–247, https://doi.org/10.1080/00221341.2013.801506

Kidman, G. (2018). School geography: what interests students, what interests teacher? *International Research in Geographical and Environmental Education, 27*(4), 311–325, https://doi.org/10.1080/10382046.2017.1349374

Kolvoord, R. A. (2021). Fostering spatial thinking skills for future citizens to support sustainable development. *Cultures of Science, 4*(1), 17–24, https://doi.org/10.1177/2096608321102471

Lam, C. C., Lai, E., & Wong, J. (2009). Implementation of geographic information system (GIS) in secondary geography curriculum in Hong Kong: Current situations and future directions. *International Research in Geographical and Environmental Education, 18*(1), 57–74, https://doi.org/10.1080/10382040802591555

Lambert, D. (2010). Geography education research and why it matters. *International Research in Geographical and Environmental Education, 19*(2), 83–86, https://doi.org/10.1080/10382046.2010.482180

Lázaro, M. L., & González, M. J. (2007). *Spain on the web: A GIS way of teaching. Teaching in and about Europe. Geography in European higher education*, 36–43, (ed. K. Donert et al), (pp. 36–43), Nicolaus Copernicus University.

Meadows, M. E. (2020). Geography education for sustainable development. *Geography and Sustainability, 1*(1), 88–92, https://doi.org/10.1016/j.geosus.2020.02.001

Miller, J., Keller, C. P., & Yore, L. D. (2005). Suggested geographic information literacy for K-12. *International Research in Geographical & Environmental Education, 14*(4), 243–250, https://doi.org/10.1080/10382040508668358

Morrison, J. L. 1991. *The organizational home for GIS in the scientific professional community. In Geographical information systems: Principles and applications*, (ed. D. Maguire. M. Goodchild, and D. Khind), (pp. 91–100). Longman Scientific and Technical.

Murphy, A. B. (1998). Rediscovering the importance of geography. *Chronicle of Higher Education, 45*(10), A64.

Nellis, M. D. (1994). Technology in geographic education: Reflections and future directions. *Journal of Geography, 93*(1), 36–39, https://doi.org/10.1080/00221349408979683

Sánchez, J. G. (2011). Teaching Geography for a Sustainable World: A Case Study of a Secondary School in Spain. *Review of International Geographical Education Online , 1* (2) , 158–182 . Retrieved from https://dergipark.org.tr/en/pub/rigeo/issue/11187/133645

van der Schee, J. (2012). Geographical education in a changing world. *J-READING Journal of reasearch and didatics in Geography*, 0, 1, (pp. 1–5) https://doi.org/10.4458/1005-02

Standish, A. (2009). *Global Perspectives in the Geography Curriculum: Reviewing the Moral Case for Geography*. Routlege.

Sung, J. H., & Choi, J. E. (2022). The Challenging and Transformative Implications of Education for Sustainable Development: A Case Study in South Korea. *Journal of Curriculum Studies Research, 4*(2), 1–14, https://doi.org/10.46303/jcsr.2022.8

Wood, B. E., & Kallio, K. P. (2019*). Green citizenship: towards spatial and lived perspectives. In The Routledge companion to environmental planning* (pp. 171–180). Routledge.

Yap, L. Y., Ivy Tan, G. C., Zhu, X., &Wettasinghe, M. C. (2008). An assessment of the use of geographical information systems (GIS) in teaching geography in Singapore schools. *Journal of Geography, 107*(2), 52–60, https://doi.org/10.1080/00221340802202047

Yli-Panula, E., Jeronen, E., &Lemmetty, P. (2019). Teaching and learning methods in geography promoting sustainability. *Education Sciences, 10*(1), 5 https://doi.org/10.3390/educsci10010005

Zhou, R. (Kevin). (2020). Education for Sustainable Development (ESD) in China's Local Primary Schools: A Pilot Study. *European Journal of Sustainable Development, 9*(4), 118. https://doi.org/10.14207/ejsd.2020.v9n4p118

School curricula and textbooks:

Ministry of Education and Research (2014). Geography curriculum for 4th grade [Programa şcolară pentru disciplina Geografie, clasa a IV-a], The National Council for the Curriculum. [online] https://media.hotnews.ro/media_server1/document-2014-10-14-18303586-0-programa-geografie-clasa.pdf

Ministry of Education and Research (2017). Geography curricula for 5-8th grades [Programa şcolară pentru disciplina Geografie, clasele a V-a - VIII-a], The National Council for the Curriculum. [online]

http://www.isjbacau.ro/compartiment-curriculum/geografie/an-scolar-2017-2018/programa-scolara-pentru-geografie-clasele-v-viii/view

Ministry of Education and Research (2004a). Geography curriculum for 9th grade [Programă şcolară pentru clasa a IX-a, Geografie], The National Council for the Curriculum. [online] https://meditatiicursuri.ro/media/2013/11/Geografie_programa_liceu.pdf

Ministry of Education and Research (2004b). Geography curriculum for 10th grade [Programă şcolară pentru clasa a X-a, Geografie], The National Council for the Curriculum. [online] https://meditatiicursuri.ro/media/2013/11/Geografie_programa_liceu.pdf

Ministry of Education and Research (2006a). Geography curriculum for 11th grade [Programă şcolară pentru clasa a XI-a, Geografie], The National Council for the Curriculum. [online] https://meditatiicursuri.ro/media/2013/11/Geografie_programa_liceu.pdf

Ministry of Education and Research (2006b). Geography curriculum for 12th grade [Programă şcolară pentru clasa a XII-a, Geografie], The National Council for the Curriculum. [online] https://meditatiicursuri.ro/media/2013/11/Geografie_programa_liceu.pdf

National Center for Policies and Evaluation in Education (Centrul Naţional de Politici şi Evaluare în Educaţie) (2023). [Digital texbooks] [Manuale şcolare digitale], Retrieved March 15, 2023, from https://www.manuale.edu.ro/