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FAMILIARITY AND OPINIONS OF MONTENEGRIN BASIC SCHOOL LEAVERS TOWARD EDUCATION FOR SUSTAINABLE DEVELOPMENT

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Abstract. *This study aimed to explore the familiarity with and opinions toward Education for Sustainable Development (ESD) among Montenegrin students at the end of their basic school years and upon entering upper-secondary school. The participants of the study were gathered in 2022, and the data were recorded via an online survey platform. The results were obtained from 705 students in the first grade of upper-secondary school. The results indicate a notable lack of student familiarity with the content of the ESD curriculum, despite it being a compulsory part of the basic school since 2014. The content listed in the curriculum of ESD for basic school is only sporadically or rarely integrated into teaching practice. Respondents mostly showed a neutral opinion toward the ESD content and its implementation practices. They did not demonstrate a clear majority opinion toward embracing sustainable thinking and behavior. Based on the study findings, there is an urgent need for comprehensive teacher training in all subjects for basic school teachers. The study recommends developing effective assessment tools for ESD concepts, providing teaching materials, and appropriate literature to integrate ESD content into each subject, ensuring the competent achievement of ESD goals.*

Keywords: *Education for Sustainable Development, Sustainable Development Goals, Montenegro, basic school leavers*

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Introduction

It is easy to see that solutions to many global challenges related to unsustainable human activities remain unresolved due to the failure to negotiate workable solutions between different stakeholders. Therefore, to effectively address the pressing global need for sustainability (Meadows, 2014), it is crucial not only to advance policies, technologies, and practices but also to focus on fostering the action competence of individuals as key agents of change (Jensen & Schnack, 2006; Arbuthnott, 2009; UN, 2015). However, to be effective and universal, education for sustainability should not rely on individual efforts by enthusiastic teachers, but on the efforts of entire educational systems. The backbone of education for sustainability at the state level is the national curriculum, which should be analyzed from different angles, including the students' perspective.

Even though adults have significant decision-making power, the influence of children who have recently entered basic and secondary schools on the acceptance of global sustainable and environmentally friendly practices should not be underestimated, as figures such as Greta Thunberg demonstrate (Sabherwal et al., 2021; Samuelsson & Kaga, 2008). Today's students are the future decision-makers, and it is therefore crucial to educate them in such a way that they develop the competencies for effective action when needed. While it is impossible to be completely certain about the value of the knowledge and skills taught today in the distant future, it is certain that at least some of them will be needed to deal with devastating environmental problems. Although the specific knowledge and skills taught today may evolve as technology advances and environmental challenges emerge, the opinions and attitudes towards sustainable living remain a constant that should be promoted through the coordinated efforts of the education system and other environmentally conscious agents of change.

Therefore, studies of curriculum components and participants' experiences and perspectives at the system-wide level are needed to provide policymakers with insights into what works in education at the state or country level so that they can implement policies and strategies for better learning outcomes in the school system.

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Education for Sustainable Development

The need for education for sustainable development stems from the realization that persistent and often unsustainable human activities have led to a range of serious, even catastrophic, environmental problems. Reflecting an era in which human activities such as resource exploitation, pollution, urbanization, and the fragmentation of natural habitats contribute to climate change, biodiversity loss, and crises, such as uncontrolled migrations, among other things, the term 'Anthropocene' has been coined to refer to the most recent geological epoch (Steffen et al., 2011). Living in the Anthropocene, where humans are both causes and victims of environmental problems, makes it necessary to find solutions that promote sustainable practices (Ruggerio, 2021).

Recognizing the urgency of global environmental protection, various international summits have been held since the mid-20th century, including the UN Conference on the Human Environment in Stockholm (UN, 1972), the UN Conference on Environment and Development in Rio de Janeiro (UN, 1992), the World Summit on Sustainable Development in Johannesburg (UN, 2002), the UN Conference on Sustainable Development in Rio de Janeiro (UN, 2012), and the 2015 UN Sustainable Development Summit in New York (UN, 2015), where the 2030 Agenda for Sustainable Development was adopted. The Agenda for Sustainable Development offers a common blueprint for peace and prosperity for people and the planet now and in the future. At its center are 17 Sustainable Development Goals (SDGs) with 169 targets that represent an urgent call to action for all countries in a global partnership. However, despite global awareness and efforts around the SDGs, the latest evidence suggests that many of the proposed SDGs are unlikely to be achieved by 2030 (Weitz et al., 2023).

Sustainable development can be thought of in three dimensions (pillars): the environment, the economy, and society (Berglund & Gericke, 2015; UN, 2015). These three pillars of sustainability are an essential part of Sustainable Development Goal 4 – Quality Education (SDG 4). SDG 4 has seven targets and three means of implementation. Of the targets of SDG 4, only target 4.7 (Education for Sustainable Development and Global Citizenship) focuses on sustainable development. Due to its importance, it is quoted verbatim (UN, 2023):

> "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture contribution to sustainable development."

However, among the proposals to implement SDG 4, there is a lack of actionable suggestions in international documents that can be applied by individual teachers to improve education, especially to achieve target 4.7. Recognizing that education is an important tool to promote sustainability, a goal of humanity reflected in the Sustainable Development Goals (UN, 2015), two main objectives can be attributed to education systems and the institutions working within them. The first objective is to bring young people closer to the material, social, cultural, and economic environment that surrounds them. Understanding planet Earth as an interconnected ecosystem is essential for developing informed solutions that result in sustainability. Solutions targeting local problems caused by global, unsustainable practices are curative; preventive measures that address the root causes of these problems are often postponed to an indefinite future, which highlights the second objective: teaching the importance of proactive change. Therefore, understanding and recognizing the Anthropocene is crucial for developing sustainable practices and strategies to mitigate the negative impact of human activities on the planet. It emphasizes the need for responsible and informed decision-making to ensure sustainable coexistence with our environment, which is a challenge for humanity (Folke et al., 2021). In response to these challenges, the 2023 SDG Summit was convened in New York, marking the beginning of a new phase of accelerated progress on the SDGs with high-level political guidance for transformative and accelerated action by 2030. In this process, all information about what has worked well and what has gone wrong in education should be scrutinized to create a better future.

Education for Sustainable Development (ESD) can be interpreted in different ways depending on the perspective (Haubrich, 2007). ESD refers to a method of meeting the needs of the present without jeopardizing the ability of future generations to meet their own needs. Environmental literacy encompasses five important facets: knowledge, awareness, behavior, commitment, and attitude (Jannah et al., 2013; Partanen-Hertell et al., 1999). It is an educational approach that aims to equip people with the knowledge, skills, values, and attitudes necessary to contribute to a more sustainable and equitable world (UNESCO, 2005). Numerous studies have addressed the question of how to implement ESD from early childhood education to higher education, using various approaches

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to improve learning. These approaches include the use of school gardens or ecological gardens (Tal & Morag, 2009), the inclusion of storytelling (Nerantzaki, 2016), the assessment of students' sustainability competences (Waltner et al., 2019), the application of systems thinking through participatory methods (Kioupi & Voulvoulis, 2019), the implementation of active learning activities for recycling (Buil-Fabregá et al., 2019), the use of educational games (Gandini et al., 2019), the promotion of extracurricular activities focusing on reflective learning (Díaz-Iso et al., 2019), the introduction of the flipped classroom as an active learning method (Buil-Fabregá et al., 2019), the design of effective learning environments (Sinakou et al., 2019), and the promotion of students' agency (Chen & Liu, 2020), among others.

The Montenegrin School System

Education is widely recognized as a foundation of social development. In Montenegro, a series of ongoing reforms have been undertaken to align the education system with contemporary trends and quality standards. These reforms have touched upon all levels of the education system, signifying a commitment to ensuring that Montenegrin education remains responsive to the evolving needs of its society.

Basic school in Montenegro, encompassing both primary (ISCED 1) and lower secondary (ISCED 2) levels, is organized as a single-structure system and holds a central place in the nation's educational landscape. It is intended to be both compulsory and freely accessible to all children aged between 6 and 15. This educational phase spans nine years and is divided into three distinct cycles. Students with special educational requirements receive their basic education in schools and support centers, ensuring that inclusivity remains a core principle.

Montenegro's public education institutions offer basic nine-year education services through a network of 162 schools, two educational centers, and three support centers. Additionally, four private schools have been granted licenses to operate in the country (Eurydice, 2023a; Eurydice, 2023b).

Content and Objectives of the Education for Sustainable Development Curriculum in Basic Schools in Montenegro

During the 27th session held on March 17, 2014, the National Council for Education established a crucial initiative known as "Education for Sustainable Development-Cross-Curricular Area" within subject programs for Montenegrin nine-year compulsory basic schools. As a premise for its inclusion in the curriculum, it was recognized that Education for Sustainable Development is inherently multidisciplinary because no single subject can comprehensively cover all the essential content required to equip students with the knowledge and skills necessary for a sustainable future (Čabrilo et al., 2014).

To implement the cross-curricular model of Education for Sustainable Development, specific topics have been defined to promote an integrative approach to general education and create stronger links between subject areas. This approach fosters the development of key competences in students. In line with Montenegrin priorities and traditions and taking into account international strategic documents in the field of ESD, eight cross-curricular topics (CCTs) have been identified. These cross-curricular topics include:

1. Climate Changes
2. Green Economy
3. Environmental Protection
4. Sustainable Cities and Settlements
5. Biodiversity
6. Health Education and Upbringing
7. Education for and about Human Rights
8. Entrepreneurial Learning

The Education for Sustainable Development curriculum for basic school presents operational objectives, student activities, timetables, and content for each topic and specifies the subjects in which these objectives are to be achieved. Overall, it can be stated that the curriculum covers all compulsory subjects that students learn during their nine years of basic school (Čabrilo et al., 2014).

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Research Problem

As the pursuit of a sustainable future is a fundamental goal for humanity, realizing the moral imperatives enshrined in the SDGs requires coordinated action at all levels and demands a transformative change in various areas of human endeavor. Education has an undeniable role to play in this ambitious endeavor, serving a dual purpose. Quality education is emphasized by the United Nations as one of the 17 SDGs (UN, 2015). Scholars highlight its potential as a tool to prepare future professionals who will innovate for a world where economic, social, and environmental aspects coexist harmoniously (Guerra, 2017; Sandri et al., 2018; Sivapalan, 2016). According to Svanström et al. (2018) and UNESCO (2018; 2020), these professionals require key competencies such as systems thinking, foresight skills, normative understanding, strategic thinking, collaboration, critical thinking, self-awareness, and integrated problem-solving. This perspective aligns with the definition of ESD, which emphasizes that activities meeting the needs of current generations must not compromise the needs of future generations (Brundtland, 1987; Camioto et al., 2017; Gbededo et al., 2018; Leal Filho et al., 2018). In this context, ESD stands out as a transformative process. The role of education in achieving the SDGs is crucial (Kopnina, 2020), as it acts as both a catalyst for environmentally conscious human action and a driving force for sustainable development (Pogge, 2004). The central role of educators as important catalysts of change (Hattie, 2003; Priestley et al., 2013) and the recognized influence of their beliefs (Biesta et al., 2015) are also well-documented.

Despite decades of commitment, the implementation of environmental education, sustainability education, and educational frameworks aligned with the SDGs remains a challenge, not only in Montenegro (Government of Montenegro, 2022) but also for the international community as a whole (OECD, 2023). The realization of the SDGs, which embody this vision, remains elusive due to various factors (Vladimirova & Le Blanc, 2016). Differing viewpoints and resolutions, as highlighted by Annan-Diab and Molinari (2017) and Kopnina (2020), reflect a range of perspectives that can sometimes diverge from the experiences of educators, schools, and communities.

The genesis of this study lies in informal dialogues with teachers, revealing concerns that Education for Sustainable Development (ESD) in Montenegro is inadequately implemented in nine-year basic schools. Thus, there exists a significant gap in understanding the current state of ESD curriculum implementation. Heberlein's (2012) three-pronged approach to environmental problem-solving—technological, systemic, and cognitive—illustrates that while changes in environmental practices arise from the first two dimensions, sustainable transformation hinges on the cognitive domain. In the Montenegrin educational context, formal environmental education in basic and secondary schools effectively addresses technological and systemic aspects. Montenegro boasts a network of public schools with well-trained educators, and the curriculum incorporates ESD principles. Another compelling reason for this research is the lack of prior examination into the implementation of ESD programs in Montenegro, despite their introduction in 2014. The aim of the study is to monitor the implementation of the ESD curriculum in basic schools by assessing the familiarity of students who have just completed it, as well as their opinions towards it. Additionally, this research aims to evaluate how effectively these programs have been integrated into everyday pedagogical practices across subjects.

Research Aim and Research Questions

In countries like Montenegro, where research resources are limited, there is a significant lack of foundational studies on sustainability education. Therefore, this study aimed to address this gap by analyzing students' familiarity with and direct opinions of Education for Sustainable Development (ESD) throughout their nine years of basic school. The study also sought to explore their perspectives on the meaning and practices associated with ESD.

Based on this aim, the following research questions were formulated to guide the study:

RQ1: Familiarity with CCTs: To what extent and through which channels are basic school students familiarized with Cross-Curricular Topics (CCTs)?

RQ2: Integration of ESD content: How frequently is ESD content integrated into basic school lessons?

RQ3: Students' opinions towards ESD: What are basic school students' opinions regarding the integration of ESD content into lessons?

By addressing these questions, valuable insights can be gained into the effectiveness of ESD implementation in Montenegrin basic schools. The findings inform evidence-based recommendations for improvements to educational authorities.

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Research Methodology

General Background

This study is an integral part of the broader research project titled "Implementation of Education for Sustainable Development in Basic and Upper Secondary Schools in Montenegro." For this study, an online survey approach was implemented using a questionnaire. The aim of the questionnaire was twofold: a) to collect information on Montenegrin basic school students' familiarity with various topics included in the national curriculum for Education for Sustainable Development, and b) to gather student opinions upon completing basic school regarding the curriculum topics and their integration into lessons. Data collection commenced on September 17 and concluded on November 17, 2022. It is important to emphasize that student participation in the survey was voluntary and anonymous.

Given that the participants in this study are minors, permission to conduct the research was obtained from the Ministry of Education of Montenegro. Additionally, the study's topic and methodology received approval from the University of Montenegro.

Sample

The study population comprised former basic-school students now enrolled in the first grade of upper-secondary schools across Montenegro. Data were systematically collected from this population to gain a comprehensive understanding of the entire basic school curriculum they had experienced, ensuring that students' responses did not influence their educational trajectory. Collecting data from students in their first year of upper secondary school was practical, as their familiarity and opinions provide an overview of their experiences across various basic schools (Lang & Šorgo, 2024). This approach diversified the sample, reflecting the broader spectrum of schools attended by students in upper secondary classes. According to the statistical reports (Monstat, 2023), a total of 7,097 students were enrolled in the first grade of upper secondary education in 2022/23. school year, distributed across 53 upper secondary schools throughout Montenegro (see Eurydice 2023a; Eurydice 2023b). Because every student potentially had an equal chance to respond to the survey, approximately 400 respondents will guarantee a 95% confidence level with a 5% margin of error. In the present study, responses from 705 students were collected, with 634 students providing a full set of responses, allowing for the assumption of representativeness of the sample, albeit with well-known limitations associated with self-selection (Elston, 2021). Socio-demographic data were not collected to maintain focus on curriculum topics rather than student differences, ensuring complete anonymity.

Sampling

The data were recorded via an online survey platform (1KA.si). Data collection took place between 17 September and 17 November 2022. At the beginning of the process, emails were sent to all secondary schools in Montenegro, explaining the objectives of the study and requesting their support. It was emphasized that the data collected in this study will be used solely for academic purposes and possible future publications, which should provide insights that can contribute to improving learning outcomes and education for sustainable development. It was made clear that participation in the survey was both anonymous and voluntary and that students were free to withdraw their participation from the survey at any time.

To maximize data collection, two reminder letters were sent to schools asking them to encourage as many students as possible to participate in the survey. To avoid disrupting regular classes, it was suggested that teachers share the survey link with their students or conduct the survey during computer science class, where access to computers is easy. In this way, in theory, every student had the opportunity to participate in the survey. However, the survey has the limitation that the responses are collected from a population that is willing to participate, which can introduce a certain degree of bias.

Instrument and Procedures

The questionnaire was created to collect data for addressing research questions. To ensure the anonymity of students, no personal data or information about their background was requested. This approach is advantageous as it encourages more candid responses, while also preventing identification of schools and teachers, thereby

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facilitating potential improvements in current practices. The first part of the study aimed to assess familiarity with the content of the eight cross-curricular topics (CCTs) outlined in the Montenegrin ESD curriculum (refer to Table 1, Table 2). Students were asked, "How did you learn about the above topics related to sustainable development?" They were instructed to select the option that best reflected their level of exposure: (1) I heard about this topic for the first time in this questionnaire; (2) This topic was only mentioned in school but not explained; (3) This topic was only explained in detail in biology class; (4) This topic was explained in detail in several subjects; (5) I only heard about this topic in the media; (6) I informed myself about this topic independently of the available literature. The content validity of the response format was ensured through consultations with experts in the field. In Table 2, there are 27 themes included in the Education for Sustainable Development (ESD) curriculum for basic school. Students were asked: "How often have basic school teachers discussed the following topics in one or more subjects?" They were instructed to select a number corresponding to the frequency using a Likert scale (as used in previous studies, e.g., Lang & Šorgo, 2024). The scale offered six options: (1) Never; (2) Very rarely; (3) Rarely; (4) Sometimes; (5) Often; (6) Very often. Since the CCTs and themes in the first two tables were directly taken from a syllabus, their content validity stands unquestioned and was accepted without further scrutiny. In the case of the ESD contents (Table 2), all measures (e.g. Bartlett's test, KMO test) were performed as precursors to the factor analysis.

In the second part of the study (Table 3), the students were asked for their opinions on the ESD contents and practices in classes during basic school. The 7-point semantic differential scale with bipolar adjectives (Gardner, 1995) offers pairs of opposing statements and a number scale of 1-7 in between. A rating of 1 indicates complete agreement with a positive opinion towards ESD, while a rating of 7 indicates complete agreement with a negative opinion towards ESD contents. Close to 1 indicates stronger support or positive opinion towards ESD, while closer to 7 indicates stronger disagreement or negative opinion towards ESD content. Theoretically, the design of the scale comes from flow theory and was adopted from the study by Šorgo et al. (2018), but to ensure validity, the items (adjective pairs) were discussed with the experts in the field. The review of the data matrix shows that the Cronbach's alpha of the instrument is .964.

Data Analysis

In the first phase after data collection, each variable was analyzed for frequencies, missing data, central tendencies, dispersion, and normality distribution (Shapiro-Wilk test). Due to the categorical nature of variables presented in Table 1, only frequencies of responses are reported. The response format for the items in Table 2 is ordinal, hence the median was chosen among measures of central tendencies. Opinions were assessed using a scale based on bipolar adjective pairs. Since responses were provided on a scale from 1 to 7, it was assumed these numbers represent intervals on underlying latent variables. Therefore, mean and standard deviation are reported alongside median and mode.

As the instruments were not used in this form previously, an exploratory factor analysis (EFA) was conducted using principal axis factoring for factor extraction with direct oblimin rotation to assess the latent structure of responses. Parallel analysis was employed to determine the extracted factors. The reliability of the instruments and resulting factors from the EFA were evaluated using Cronbach's alpha coefficient, with a cutoff value of .7 set for proceeding with the analyses. Statistical analyses were performed using the open-source software Jamovi, version 2.3 (Jamovi, 2022)

Research Results

Students' Familiarity with the Cross-curricular Topics (CCTs) of the Basic School Curriculum of ESD

Students' familiarity with the eight cross-curricular topics (CCTs) of the basic school curriculum of ESD are presented in Table 1, through frequencies of the type of introduction during basic school.

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Table 1
Frequencies of the Type of Introduction to Cross-curricular Topics (CCTs) during Basic School

Code	CCTs	Familiarization*							
		1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	Sum 3+4	Sum 5+6
Q1c	Environmental protection	77 10.9	37 5.2	245 34.7	266 37.8	23 3.3	57 8.1	511 73.8	80 11.4
Q1e	Biodiversity	100 14.2	39 5.5	442 62.6	81 11.5	21 3	23 3.3	523 74.1	44 3.6
Q1f	Health education	103 14.6	86 12.2	72 10.2	295 41.8	56 7.9	94 13.3	367 52	150 21.2
Q1a	Climate change	118 16.7	76 10.8	131 18.6	263 27.3	60 8.5	58 8.2	394 45.9	118 16.7
Q1g	Human rights education	120 17	94 13.3	46 6.5	286 40.5	72 10.2	88 12.5	332 47	160 22.7
Q1d	Sustainable cities and settlements	173 24.5	147 20.8	69 9.8	198 28	77 10.9	42 5.9	267 37.8	119 16.8
Q1b	Green economy	286 40.5	117 16.6	154 21.8	61 8.6	61 8.6	27 3.8	215 30.4	88 12.4
Q1h	Entrepreneurial learning	299 42.4	158 22.4	26 3.7	109 15.4	59 8.4	55 7.8	135 19.1	114 16.5

Note. (CCTs) Cross-curricular topics; Familiarization*: (1) I heard about this topic for the first time in this questionnaire; (2) This topic was only mentioned in school but not explained; (3) This topic was only explained in detail in biology class; (4) This topic was explained in detail in several subjects; (5) I only heard about this topic in the media; (6) I informed myself about this topic independently of the available literature. The highest values (modes) are bolded.

When analyzing the data presented in Table 1, several important findings emerge. The most important finding is that all cross-curricular topics (CCTs) were absent for at least some of the students, with a range of about 11% for environmental protection and about 40% for Green economy and Entrepreneurship learning (column 1). On the other side of Table 1 (sum of columns 5 and 6), the frequencies in the last two columns, relating to media and literature, show the importance of structured educational approaches to ESD. In most cases, the 10% threshold for self-education and private initiative is not reached, and only in four cases is the percentage in the 10% to 15% range. The informing but not formative role of formal education is easily recognizable in column 2, where responses that the topics were only mentioned but not explained range from around 5% to 22%.

The aim for all CCTs to be covered across several subjects, promoting a comprehensive understanding of these topics and aligning with ESD curriculum guidelines, has not been fully achieved. Only three topics—Health Education, Human Rights, and Environmental Protection—reach a coverage level of approximately 40%. At the lower end of the scale, close to 10%, are the topics of Biodiversity and Green economy. The situation can be described as slightly better as topics closely linked to the general objectives of biology lessons (Q1c-Environmental protection, Q1e-Biodiversity) are mainly introduced within this specific subject. Despite the intention to treat all ESD topics in a cross-curricular way, students mainly encounter these topics within the biology curriculum. Familiarity with the topics can therefore be deduced from the summation of sums 3 (This topic was only explained in detail in biology lessons) and 4 (This topic was explained in detail in several subjects), which show that around three-quarters of students receive comprehensive information about Environmental protection and Biodiversity and only around one fifth about Entrepreneurial learning. It is evident that students are least familiar with the concepts of Entrepreneurial learning and Green economy during their basic school years, more so, about two-fifths of the respondents encountered these cross-curricular while completing the questionnaire for this research.

Inclusion of ESD Themes in the in Basic School Lessons

The results are presented as frequency and median values of inclusion of ESD themes in basic school lessons followed by factor loadings (Table 2).

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Table 2

Frequencies, Median Values and Factor Loadings of the Inclusion of ESD Themes in Basic School Lessons

Code	ESD themes	N	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	$\tilde{\chi}$	Factor 1	Factor 2
Q6aw	The importance of a healthy environment for human health	631	86 13.7	54 8.6	86 13.6	136 21.6	133 21.1	136 21.6	4	1.000	
Q6ak	How can each of us help preserve the environment?	630	91 14.4	47 7.5	77 12.2	117 18.6	168 26.7	130 20.6	4	.984	
Q6av	Consequences of improper nutrition and poor physical activity	631	95 15.1	53 8.4	90 14.3	135 21.4	133 21.1	125 19.8	4	.940	
Q6am	Significance, composition, and sources of air pollution	630	86 13.7	67 10.6	80 12.7	153 24.3	132 21	112 17.8	4	.891	
Q6au	Flora and fauna of National Parks, internationally protected habitats, and protected species in Montenegro	628	93 14.8	55 8.8	89 14.2	149 23.7	130 20.7	112 17.8	4	.888	
Q6ag	The problem with waste and the importance of recycling	629	95 15.1	58 9.2	77 12.2	150 23.8	136 21.6	113 18	4	.862	
Q6ap	Ways to reduce pollution from traffic	630	100 15.9	70 11.1	95 15.1	141 22.4	132 21	92 14.6	4	.851	
Q6ac	Consequences of climate change	629	83 13.2	58 9.2	71 11.3	154 24.5	166 26.4	97 15.4	4	.805	
Q6ab	Global warming, the greenhouse effect	630	86 13.7	62 9.8	87 13.8	169 26.8	148 23.5	78 12.4	4	.804	
Q6az	Respect for diversity	628	105 16.7	41 6.5	89 14.2	113 18	128 20.4	152 24.2	4	.762	
Q6ah	Types and importance of renewable energy sources	630	90 14.3	71 11.3	92 14.6	163 25.9	135 21.4	79 12.5	4	.759	
Q6aj	Ecological problems in Montenegro	631	106 16.8	50 7.9	82 13	132 20.9	165 26.1	96 15.2	4	.747	
Q6at	The consequences of the destruction of rivers, lakes, seas and coasts	627	90 14.4	57 9.1	110 17.5	130 20.7	135 21.5	105 16.7	4	.747	
Q6af	The importance of forests and their sustainable management	630	91 14.4	64 10.2	83 13.2	143 22.7	130 20.6	119 18.9	4	.744	
Q6an	Acid rains and their impact	630	111 17.6	65 10.3	103 16.3	165 26.2	98 15.6	88 14	4	.730	
Q6ar	The importance of land, its protection	630	94 14.9	63 10	92 14.6	168 26.7	124 19.7	89 14.1	4	.725	
Q6ax	Rights and obligations in the community	630	102 16.2	57 9	100 15.9	138 21.9	136 21.6	97 15.4	4	.707	
Q6ao	The importance of rational use of natural resources	630	105 16.7	83 13.2	117 18.6	163 25.9	87 13.8	75 11.9	4	.668	
Q6aq	Causes of biodiversity decline	630	118 18.7	62 9.8	105 16.7	169 26.8	106 16.8	70 11.1	4	.625	
Q6as	Ecological importance of mountain areas	631	103 16.3	71 11.3	103 16.3	156 24.7	112 17.7	86 13.6	4	.563	.327
Q6al	Sources of noise and its impact on human health	630	133 21.1	85 13.5	107 17	144 22.9	92 14.6	69 11	3	.397	.458
Q6ai	Advantages and disadvantages of fossil fuels	630	136 21.6	92 14.6	109 17.3	159 25.2	83 13.2	51 8.1	3	.365	.462
Q6ae	Sustainable agriculture	629	154 24.5	89 14.1	116 18.4	151 24	69 11	50 7.9	3		.757

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Code	ESD themes	N	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	6 (%)	$\tilde{\chi}$	Factor 1	Factor 2
Q6ad	"Green economy"	626	187 29.9	82 13.1	113 18.1	123 19.6	80 12.8	41 6.5	3		.737
Q6ba	European Union, advantages and disadvantages of Montenegro's entry into the European Union	630	200 31.7	72 11.4	85 13.5	130 20.6	71 11.3	72 11.4	3		.707
Q6aa	Sustainable development	631	174 27.6	102 16.2	124 19.7	122 19.3	72 11.4	37 5.9	3		.557
Q6ay	The difference between sex and gender	630	157 24.9	67 10.6	103 16.3	133 21.1	96 15.2	74 11.7	3		.537

Note. 1-Never; 2-Very rare; 3-Rarely; 4-Sometimes; 5-Often; 6-Very often; $\tilde{\chi}$-median; The highest values representing modes are bolded; 'Principal axis factoring' extraction method was used in combination with an 'oblimin' rotation.

When analyzing the frequencies of items shown in Table 2, it became clear that the themes intended for student education were absent in a range of about 13% to 30%, and only up to 20% of the themes were included very frequently. When analyzing the median values shown in Table 2, it became clear that the topics listed in the ESD curriculum for basic schools fall into the "sometimes" (20 cases) or "rarely" (7 cases) categories. However, there are instances (Q6aa, Q6ad, Q6ae, Q6ay, and Q6ba) where the mode value is 1 (indicating "never"), and only two cases (Q6aw, Q6az) have a mode 6 (very often).

A further analysis of the frequency of inclusion of ESD themes in lessons shows that Cronbach's alpha of the instrument is .981. By applying the EFA (Table 2), two highly correlated factors were extracted, which explained 68.9 % of the variance. The first factor (eigenvalue 14.37; 53.2 % of the explained variance) includes numerous topics that explain the impact of resource mismanagement in Montenegro and globally, as well as the importance of their sustainable use. The second factor (eigenvalue 4.25; 68.9% of the explained variance) includes the concept of sustainable development and the green economy, as well as the benefits of Montenegro's accession to the EU. The items Q6ai and Q6al are represented in both factors.

Opinions of the Basic School Leavers toward Greater Inclusion of ESD Content in Classes

The results of frequencies, measures of central tendencies, and exploratory factor analysis of opinions toward greater inclusion of ESD content in the teaching are provided in Table 3.

Table 3
Frequencies, Measures of Central Tendencies, and Factor Loadings of the Opinions toward ESD Contents and Practices in Classes

Code	Bipolar adjectives	*N*	1	2	3	4	5	6	7	$\tilde{\chi}$	s	Factor 1	Factor 2
Q5k	Important for human health-Unimportant for human health	639	138 21.6	66 10.3	82 12.8	112 17.5	54 8.5	50 7.8	137 21.4	3.90	219		.946
Q5j	Important for a healthy environment-Unimportant for a healthy environment	640	132 20.6	70 10.9	74 11.6	123 19.2	54 8.4	54 8.4	133 20.8	3.92	2.17		.917
Q5l	Important for survival on the Earth-Unimportant to survival on the Earth	638	140 21.9	66 10.3	68 10.7	115 18	70 11	41 6.4	138 21.6	3.92	2.19		.898
Q5g	Important for students-Unimportant for students	641	97 15.1	81 12.6	88 13.7	117 18.3	87 13.6	46 7.2	125 19.5	4.02	2.05	.624	
Q5a	Useful-Useless	646	86 13.3	61 9.4	99 15.3	152 23.5	97 15	49 7.6	102 15.8	4.03	1.9	.853	
Q5b	Necessary-Needlessly	641	73 11.4	65 10.1	116 18.1	140 21.8	96 15	47 7.3	104 16.2	4.06	1.88	.852	
Q5i	Important for the future generations-Unimportant for future generations	641	103 16.1	83 12.9	78 12.2	118 18.4	61 9.5	62 9.7	136 21.2	4.06	2.12	.378	.545

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Code	Bipolar adjectives	*N*	1	2	3	4	5	6	7	$\tilde{\chi}$	s	Factor 1	Factor 2
Q5f	Important for the whole society-Unimportant to society	642	106 16.5	64 10	74 11.5	137 21.3	76 11.8	54 8.4	131 20.4	4.09	2.07	.561	.355
Q5c	Interesting-boring	642	85 13.2	65 10.1	97 15.1	134 20.9	84 13.1	55 8.6	122 19	4.12	1.98	.906	
Q5e	Easy for students to master-Difficult for students to master	640	65 10.2	75 11.7	99 15.5	134 20.9	90 14.1	65 10.2	112 17.5	4.17	1.91	.861	
Q5h	Important to my further education-Unimportant to my further education	641	65 10.1	79 12.3	93 14.5	139 21.7	80 12.5	59 9.2	126 19.7	4.20	1.94	.728	
Q5d	Easy for teachers to realize-Difficult for teachers to realize	640	63 9.8	50 7.8	105 16.4	149 23.3	102 15.9	60 9.4	111 17.3	4.25	1.84	.757	

Note. All medians have value 4. The highest frequencies (modes) are bolded. The Table is sorted by increasing mean ($\tilde{\chi}$). Semantic bipolar scale from 1 to 7: a rating of 1-complete agreement with a positive opinion towards ESD, while a rating of 7 indicates complete agreement with a negative opinion towards ESD. *s*-standard deviation. 'Principal axis factoring' extraction method was used in combination with an 'oblimin' rotation. Cronbach's alpha = .964

An analysis of the results in Table 3 reveals several findings. Analyzing the medians and means shows that all medians have a value of four, and the means range from 3.90 to 4.20, indicating a neutral position of the two measures for the central tendencies. A better insight can be gained by analyzing the frequencies of the responses. The distribution of frequencies shows that there are three items at the top of Table 3 whose mean values are slightly below the center point, and the number of those who hold extremely opposing opinions is almost equal (Q5k, Q5j, Q5l) with regard to the (un)importance of ESD for human health, a healthy environment, and survival on earth. At the lower end of the table are opinions where more students think that ESD is boring, difficult to master, unimportant for further education and that teachers have difficulties in implementing the ESD curriculum.

When further analyzing the significance of opinions towards ESD content and practices in the classroom by applying factorial analysis, two highly correlated factors were extracted, explaining 74.4% of the variance. The factor loadings are listed in Table 3. The first factor (eigenvalue 5.41; 45.1% of the explained variance) contains items about the interest, necessity and importance of ESD for students' future, with opinions being mostly neutral or negative. The second factor (eigenvalue 3.52; 29.3% of the explained variance) contains three items on the importance of ESD for survival on a global level and for the human health, with opinions divided into two extremes.

Discussion

At this point, the problem arises that the results of the present study cannot be directly compared with international studies, as the Montenegrin ESD curriculum is in some ways unique, even though the idea of ESD is integrated into many educational systems (e.g. Rauch, 2002). Another problem was that the references that show some similarity to the present study mostly report results from studies at the university level and very rarely at the basic or secondary school level (e.g. Šorgo & Kamenšek, 2012) and that even when the populations matched, the focus is different (e.g. Boeve-de Pauw et al., 2015). Not exactly helpful in categorizing the results is the diversity of school systems, where basic school years before diversification in different directions can be of any length, from 4 years (e.g. in the Czech Republic or Germany) to 9 years as in Slovenia or Montenegro (see Eurydice websites for details).

In seeking to answer the research question about familiarity and the channels through which students receive information about and are exposed to the curriculum topics, it is apparent that for all of the topics we surveyed, at least some students did not receive information about them during their basic school education. Additionally, only 5 of the 8 CCTs from the ESD curriculum were implemented in multiple subjects (28-41% of respondents), which is in line with the recommended approach (Van den Branden, 2012). From the perspective of these five topics (Environmental protection; Health education; Climate change; Human rights education; Sustainable cities and settlements), the results are optimistic. However, in three topics (Biodiversity; Green economy; Entrepreneurial learning), reasons and limitations that prevent cross-curricular implementation need to be identified. The highest familiarity is around three-quarters of the students for the topics of Environmental protection and Biodiversity, while the lowest is around one-fifth for Entrepreneurial learning. It is evident that students are the least familiar with the concepts of Entrepreneurial learning and the Green economy during their years in basic school. About

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two-fifths of the respondents encountered these topics for the first time in this questionnaire, which is a concerning finding. The interpretation of this result can be summarized with the statement by Silajdžić et al. (2015) that governmental and educational institutions fail to recognize their role and do not adequately support the development of green entrepreneurship.

When analyzing the results regarding the frequency of exposure to the detailed list of themes presented in Table 2, it became evident that the themes outlined in the ESD curriculum for basic schools predominantly fell into the categories of 'sometimes' or even 'rarely'. The most concerning finding is that for all of the themes listed, at least some students have never encountered the theme as part of the school curriculum. Combined with the finding from Table 1 that self-education cannot be relied upon (columns 5 and 6), the results are truly alarming. These findings underscore a significant gap between the intended curriculum and its actual implementation, a well-documented issue in the literature (e.g., Penuel et al., 2007). In Montenegro, certain ESD themes were consistently overlooked or inadequately addressed in basic education. The data clearly shows that the themes listed in the ESD curriculum for basic schools were only sporadically or rarely integrated into classroom practice. For example, regarding topics such as the European Union, the 'green economy', and sustainable development, almost a third of students stated that they had never encountered these topics during their basic school years. While these results cannot be directly compared with international findings due to contextual differences, they affirm the realization that simply including a topic in the curriculum does not guarantee its effective teaching to students (e.g., Šorgo & Kamenšek, 2012).

Nearly a decade has passed since the mandatory inclusion of these topics in all basic school subjects (Čabrilo et al., 2014), so one would expect a comprehensive coverage of these topics. However, based on the research design, it is not possible to definitively answer why certain curriculum topics are not included in daily lessons. It could be speculated that teachers may not have been sufficiently prepared or willing to teach this content, despite its mandatory status. Another assumption is that the overloaded compulsory curriculum in basic school subjects likely restricts teachers' ability to integrate cross-curricular content, including ESD (Kopnina, 2020). To address this issue, a careful revision of the compulsory curriculum is suggested to reduce teachers' workload. Alongside this, implementing mandatory retraining programs for teachers across all subjects could better equip them to integrate topics like ESD effectively. By creating a more balanced curriculum and providing ongoing professional development, teachers would have the time, skills, and flexibility needed to promote a more holistic and sustainable approach to education.

Understanding students' opinions on content delivery practices is crucial for predicting future behaviors. However, an analysis of students' opinions reveals a concerning trend: many perceive ESD similar to the documented findings for subjects like biology, which is emphasized as dull, lifeless, and boring (Tranter, 2004). This perception suggests that the issue lies not in the importance of the topics themselves but rather in how they are presented in schools (Kletečki et al., 2023). At this pivotal stage in their education, students ideally should have acquired foundational knowledge, developed sustainable habits, and cultivated awareness about their well-being and the planet's future. Yet, their somewhat ambivalent attitudes toward the balanced integration of economic, social, and environmental development are less than ideal. While some students express positivity, there is a notable lack of a clear and resolute stance among young people on the importance of sustainability, considering their future roles as academics, engineers, doctors, and parents. This clearly indicates that the current ESD curriculum in basic school has not yielded the anticipated results. This is evident from students' inability to articulate a more positive and informed perspective on sustainable thinking and action. This critical mismatch underscores a significant gap between the intended impact of the ESD curriculum and students' actual perceptions. These findings underscore the urgent need to enhance students' awareness of ESD's significance, not only for personal growth but also for global well-being. Specifically, there is a compelling argument to intensify ESD content in upper secondary schools, given the less-than-encouraging outcomes observed in basic schools. To effectively bridge this gap, it is essential to conduct a thorough reevaluation of the curriculum's implementation strategy. This reassessment should focus on making necessary adjustments aimed at achieving the desired outcomes of enhancing sustainability awareness and cultivating a proactive mindset among students.

Conclusions and Implications

The study analyses familiarity with and opinions toward ESD of Montenegrin first-grade upper secondary school students (fifteen-year-olds). The results indicate that students are insufficiently familiar with the content of the ESD curriculum, although it has been mandatory in nine-year basic school since 2014. The data strongly suggest that the themes listed in the curriculum framework for ESD in basic school are only sporadically or rarely

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integrated into teaching practice. Furthermore, the fundamental objective of integrating all topics from the ESD program should be implemented cross-curricularly, has not been achieved. Additionally, fifteen-year-olds mostly showed a neutral opinion toward the themes of the curriculum and its implementation practices. They did not demonstrate a clear majority opinion toward embracing sustainable thinking and behavior. Overall, the results emphasize the discrepancy between the planned curriculum and its actual implementation.

These results make it clear that the introduction of a curriculum is no guarantee that teachers will incorporate it appropriately into their lesson plans. To ensure the effective implementation of the ESD goals outlined in the curriculum, it is crucial to develop and improve the comprehensive training of teachers of all subjects in basic school in Montenegro and develop effective assessment tools to measure students' knowledge and application of ESD concepts. Also, a careful revision of the compulsory curriculum to alleviate teachers' workload. In addition, it is important to create the conditions for smooth implementation, including the provision of teaching materials and appropriate literature for the implementation of ESD content for each subject, which would have detailed methodological instructions for implementation. Such measures would lay the foundation for a more successful implementation of ESD and raise students' awareness of the central role of sustainable development for humanity.

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Declaration of Interest

The authors declare no competing interest.

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