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# The Importance of International Collaboration to Enhance Education for Environmental Citizenship

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Abstract: Environmental Education is essential to promote awareness and facilitate the development of environmental citizens. To contribute to the enhancement of environmental awareness, Iceland, Serbia, Bosnia and Herzegovina, and Romania have collaborated in joint educational projects which aim at building capacities on sustainable development, delivering environmental teaching lectures, and developing open educational resources. This article presents past and ongoing collaborations between the mentioned countries, assesses the status of environmental education, and highlights the benefits of international collaboration. For this purpose, information on environmental courses in representative universities from each country was collected, SWOT analyses were performed in each country, and a survey among potential students was carried out. The presented analysis reveals that international collaboration raises environmental awareness and increases the likelihood of becoming environmental citizens.

**Keywords:** environmental awareness; environmental citizen; environmental education; international collaboration



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#### 1. Introduction

The concept of environmental citizen has thoroughly been addressed in the literature [1–3] and redefined within the European Network for Environmental Citizenship COST action CA16229 (ENEC) [4]. The "Environmental Citizen" is defined as the citizen who has coherent and adequate knowledge, necessary skills, values, attitudes, and competencies to be able to act and participate in society as an agent of change in the private and public life, on a local, national, and global scale, through individual and collective actions in the direction of solving contemporary environmental problems, preventing the creation of new environmental problems, achieving sustainability, and developing a healthy relationship with nature. The environmental citizen practices environmental rights and duties and is capable to identify causes of environmental degradation and problems. Furthermore, the environmental citizen has the willingness and the competencies for active engagement and participation to act individually and collectively, taking into account generational justice [5]. To fulfill these requirements of an environmental citizen, education is essential, as discussed by Smederevac-Lalic et al. [6].

Citizens are formed in a long and complex process of political socialization through education, media, and popular culture [3]. The wisdom of knowledge is needed for ecolog-

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ical citizenship that comes from knowing the holistic and basic aspects of environmental science. Education for Environmental Citizenship needs integrated systems of knowledge that focus on the understanding of human-environment interactions and the links between knowledge and actions for sustainability [6,7]. Knowledge is an essential element for proenvironmental behavior, and subsequently, pro-environmental behavior will consequently lead to environmental citizenship [6]. Education has been identified as a driver that can affect behavioral changes in citizens. Science education for responsible citizenship is recognized by the European Commission to be one of the main issues that could help citizens to get knowledge and participate actively, responsibly, and successfully in society [5]. Since environmental problems are complex and interdisciplinary, students have to be educated on how to approach these problems. One of the goals of environmental education is to form students that are capable of acting as informed and empowered citizens. Environmental citizenship in an educational context seems to be an imperative necessity [5].

The United Nations 17 Sustainable Development Goals (SDGs) are perhaps a more commonly known concept that is aligned with the concept of Environmental Citizen. The SDGs were adopted in 2015 by 193 member states to address global pressing social and environmental issues [8]. The SDGs aim at creating incentives for a more sustainable future for all humans on the planet. In Europe there exist various funding mechanisms to promote the implementations of SDGs, such as quality education (SDG 4), affordable and clean energy (SDG 7), sustainable cities and communities (SDG 11), partnerships for the goals (SDG 17).

A particular focus of such funding mechanisms is the collaboration between high education institutions (HEIs) from economically stronger countries with economically weaker countries in order to facilitate capacity building and knowledge transfer to less affluent counties. An illustrative example of such a knowledge transfer is the collaboration of Iceland, a country relying entirely on renewables, and the Balkan countries, which still rely primarily on fossil energy sources. Due to its location and geographical conditions, Iceland produces its entire domestic energy from geothermal and hydropower sources, while most of the Balkan states still rely on coal and other fossil fuel-based energy sources. Nevertheless, geothermal sources are abundant across the Balkans, being cheaper and cleaner, are still unexploited, due to a lack of education and general awareness. This circumstance is the reason why the collaboration between Iceland and the Balkans might be of particular importance.

In this study, we will present, analyze and highlight the importance of international collaboration between Iceland and key Balkan states, namely, Serbia, Bosnia and Herzegovina (BA), and Romania. The presented collaborations were primarily funded through EU programs such as the Financial Mechanism of the European Economic Area (EEA), CEEPUS, Erasmus+, and The European Cooperation in Science and Technology (COST Association). In the frame of these funding programs, HEIs from Iceland, Serbia, Bosnia and Herzegovina, and Romania have been and are collaborating on various educational projects: (i) joint educational lectures on sustainable management of natural resources and renewable energies, (ii) building capacities on sustainable development, and (iii) developing open educational resources (OERs) for rural citizens. As illustrative examples representative universities from each country were chosen, namely, Reykjavik University in Iceland, Brasov University and Timisoara University in Romania, the University of Banja Luka in BA, and Belgrade University in Serbia.

This study will describe the ongoing collaboration, highlight the importance to provide environmental education (EE) and education for environmental citizenship (EEC) and conclude how the collaboration enhances awareness. Indeed, EE and EEC are important for enhancing environmental awareness and for promoting the concept of environmental citizenship [4]. Environmental education provides the basic knowledge necessary for environmental awareness, can impact an entire population, and finally contributes to the likelihood of becoming environmental citizens. The concept of EEC was, in all investigated countries, new and accordingly not well embedded into the curriculum of the universities.

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Nevertheless, since EE is the key driver for EEC, we focused in this paper on EE pointing out that it can lead to EEC. The study concludes by identifying international collaboration as a key driver for enhancing environmental awareness and promoting environmental citizenship.

#### 2. Methodology

In order to assess the status of EE and EEC in Iceland, Romania, Serbia, and Bosnia we reviewed the curriculum of five key universities in each mentioned country: (i) Reykjavik University, with over 3500 students the biggest private university in Iceland, (ii) Transilvania University of Brasov (almost 20,000 students) and Politehnica University of Timisoara (14,000 students), two well-established universities in Romania, (iii) Belgrade University, with 98,000 students the biggest university in Serbia, and (iv) the University of Banja Luka, with 12,000 students one of the biggest universities in Bosnia. The universities were selected based on their reputation, their size, and their international collaboration. Data on EE and EEC courses and average student participation were collected directly from according to program managers, i.e., deans, rectors, or heads of faculties. The curriculum of each university was analyzed using a SWOT analysis conducted under the ENEC Cost Action and summarized in the SWOT Analysis on Education for Environmental Citizenship report by Hadjichambis et al. [9]. The SWOT analysis is based on questionnaires that have been designed to collect information from experts (academics, researchers, teachers, Ministry of Education officers, and NGOs) from each participating country in ENEC. Finally, a survey among students that are aware of EE and EEC was conducted in order to assess the perception of EE. In the present paper, we summarize, compare, and highlight strengths, weaknesses, opportunities, and threats regarding Education for Environmental Citizenship in each above-mentioned university.

#### 3. Education for Environmental Citizenship

#### 3.1. Environmental Education in Iceland

Iceland is geographically isolated in the North Atlantic and accordingly is directly dependent on international collaboration to drive innovation, information exchange, and capacity building. Being a member of the European Economic Area, the Nordic community, the Arctic Circle, and having close ties to North America, Iceland has a long history of intense exchange with both, Europe and North America. With the high potential of renewable energy sources (water resources for hydropower production [10], geothermal sources for thermal energy [11], and optimal wind conditions for wind-farms), Iceland can also export expertise and knowhow on renewable energy production as well as side products such as power-to-X [12,13], added value form residual streams and sustainable management of fish resources [14].

Although Iceland's economy has experienced turbulent times, including a financial crisis in 2008, the GDP of Iceland has been consistently ranked in the top 10 worldwide [15]. One important contribution to the productive and resilient Icelandic economy is the efficient use of natural resources [14]. Iceland spends about 3% of its GDP on scientific research and development (R&D), about 1 percentage point higher than the EU average of 2%, and has set a target of 4% to reach by 2020 [16]. Out of 72 countries that spend the most on R&D (USD 100 million or more), Iceland ranked 9th by the proportion of GDP, tied with Taiwan, Switzerland, and Germany and ahead of France, the UK, and Canada [17]. In total, 64% of Icelanders aged 25–64 have earned the equivalent of a high-school degree, which is lower than the OECD average of 73%. Among 25- to 34-year-olds, only 69% have earned the equivalent of a high-school degree, significantly lower than the OECD average of 80% [18].

Environmental education at the university level is present in all seven universities. The University of Iceland offers a master's degree in environment and natural resources, Reykjavík University has a Sustainability Institute and Forum, the University of Akureyri offers a Master program in the sustainable production of marine bio-resources, the Agricul-

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tural University emphasizes environmental science and Bifröst University offers courses on sustainability and social responsibility.

This study will focus on the activities carried out by Reykjavík University (RU). RU is the largest private university in Iceland with more than 3500 students. It is chartered by the Chamber of Commerce, the Federation of Icelandic Industries, and the Confederation of Icelandic Employers. The school of technology at RU focuses on the renewable energy sector, providing domestic and foreign students hands-on training on geothermal energy, hydropower production, and sustainable engineering (Table 1). While renewable energies are the main focus, environmental educational courses, such as Environmental Impact Assessment and Sustainable Engineering provide students a holistic overview needed for sustainable development. For this purpose, theoretical concepts are being taught, examples from the main industries are discussed, and field excursions to real-life labs are being organized. These courses put the bio-economy at the center of sustainable development. Since 2019 most courses include the concept of EEC as well.

University	Department	Study Program/ 2nd Level <sup>1</sup>	Courses Title EE Contents <sup>2</sup>	Enrolled Student <sup>3</sup>
Reykjavik University/School of Technology	Department of Engineering	Civil engineering Mechanical engineering Electrical engineering Engineering management	Environmental Impact Assessment (EE/EEC) Sustainable engineering and the environment (EE/EEC)	35
	Iceland School of Energy	MSc Sustainable Energy MSc Sustainable Energy Engineering MSc Electric Power Engineering MSc Electric Power Management Professional Development	Environmental Impact Assessment (EE/EEC) Sustainable engineering and the environment (EE/EEC) ISE Summer school (EE)	35

Table 1. Overview of environmental education at Reykjavik University.

#### 3.2. Education for Environmental Citizenship in Romania

Courses

The educational system in Romania has undergone numerous reforms in the past decades, all of them failing to overcome the barriers of conservatism implemented during the Soviet-Communism area. Thus, Education for Environmental Citizenship is a new concept for Romania. Nevertheless, ecological education and education for sustainable development have been implemented in the university curriculum as a result of Romania's accession to the European Union. Furthermore, the notion of environmental psychology has been incorporated into the educational system.

The implementation of EEC into the educational system must be done in correlation with existing educational paradigms related to environment protection. Based on the results of a study conducted in 2018 with experts in the field of education, we can say that this complex concept of EEC includes all the other types of sustainable and environmental education and should be approached from early ages, and for different educational levels. EEC is perceived to be built around the key term "environment", a more quantitative approach, this being the binder between several types of education, which needs a more qualitative analysis.

Another relevant aspect in understanding the difficulty of introducing EEC in Romania is that of the diversity of higher education institutions. In technical universities, the issue of environmental protection is only partially approached and strictly addressed from a technical point of view (e.g., what is the impact of different types of economic activities

<sup>&</sup>lt;sup>1</sup> 2nd level is equivalent to master; <sup>2</sup> EE—Environmental Education, EEC—Education for Environmental Citizenship; <sup>3</sup> each course is attended on average by 35 students.

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on the environment). In response to increasing environmental concern, the Romanian higher educational system sustains the development of graduates' competencies related to environmental protection, at the undergraduate level, as set at the national level [19]:

- curricula in the field of environmental studies, such as Environmental Engineering (240 ECTS), Environmental Sciences (180 ECTS) Environmental Economics (180 ECTS) Environmental Management (180 ECTS);
- curricula in the field of different engineering studies, focusing on environmental issues, such as Energetics, Civil Engineering, Industrial Engineering, Food Industry, Agriculture;
- isolated courses introduced in the curricula of different study programs, at university decision, such as Ecology and Environmental Protection (studies in the field of Agronomy), Environmental Protection (studies in the field of Architecture), Environmental Law (studies in the field of Laws), Environmental Sociology and Environmental Anthropology (studies in the field of Social Sciences, Policy and Communication), Environmental Policies (studies in the field of Administrative, Educational Sciences, and Psychology), Environmental Management, Ecological Policy, Environmental Policy (studies in the field of Economic Sciences).

Based on autonomy, each university decides the curricula for a specified study program, in between the limits imposed by the national rules (in terms of study courses), and is responsible for the course content to develop the students' targeted competencies.

Considering two high education institutions from Romania, Transilvania University of Brasov and Politehnica University of Timisoara, the experience in environmental education, gained from more than 20 years, is summarized in Table 2.

**Table 2.** Overview of environmental education and environmental citizenship education at universities from Timisoara and Brasov.

University	Faculty	Study Program/ 1st or 2nd Level <sup>1</sup>	Courses Title EE/EEC Contents <sup>2</sup>	Enrolled Student
Transilvania University of Brasov	Product Design and Environment	Industrial Environmental Engineering and Protection/1st	EE curriculum	100
			Environment and Society (EEC)	25
		Engineering of Renewable Energy Systems/1st	EE curriculum	100
			Environment and Society (EEC)	25
		Sustainable Product Design and Environment Protection/2nd	EE curriculum	25
Politehnica University of Timisoara	Civil Engineering	Civil Engineering/1st	Environmental engineering (EE)	100
		Optimizing the operation of sanitary engineering systems and environmental protection/2nd	Sustainable development through projects and programs (EE)	55
		Optimization of hydro-technical systems/2nd	Programo (22)	
	Industrial Chemistry and Environmental Protection	Inorganic Substances Engineering and Environmental Protection/1st	Environment protection (EE)	30

<sup>&</sup>lt;sup>1</sup> 1st level = bachelor, 2nd level = master; <sup>2</sup> EE—Environmental Education, EEC—Education for Environmental Citizenship.

In the frame of the formal curriculum, as part of the umbrella concept of environmental education, the environmental engineering curricula run both at bachelor and master level, even in the field of environmental engineering studies, or in other engineering fields. The focus on education for environmental citizenship is less approached, but the course "Environment and society" delivered at the Transilvania University of Brasov provides

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learning experiences to develop student's knowledge and attitudes which might contribute to their active involvement in societal environmental problems.

#### 3.3. Education for Environmental Citizenship in Serbia

Environmental education in Serbia was included in the educational agenda in different forms for more than a century but it was never a leading subject and the whole concept of EEC is not established and understood well in Serbia [9]. The terminology of EE and ESD, SE, and CE was not differentiated, even the terms ecology and environmental protection are often confused. The Environmental Education (EE) system in Serbia is not reflected in the concept of Education for Environmental Citizenship. There are 17 universities in Serbia eight public and nine private universities. The University of Belgrade is the oldest and largest university in Serbia. It consists of 31 faculties with around 98,000 students, as well as 11 research institutes, the university library, and seven university centers. The faculties of the university are organized into four groups: social sciences and humanities, sciences and mathematics, medical sciences, and technology and engineering sciences.

Based on the results of the SWOT analysis conducted in 2018–2019 with experts in the field of education [9], the complex concept of EEC in Serbia is considered under the term "environment" and covers several types of education. Same as in the Romanian case, the diversity of faculties at the University in Serbia complicates understanding and implementation of EEC. Technical universities are covering the issue of environmental protection from a technical point of view, while natural sciences are more oriented toward sustainable use and development. Increasing environmental concern started between two conferences, Rio, 1992 and Johannesburg 2002, and it started to be of national importance and issue of cooperation of two ministries (Ministry of Education and Ministry of Environmental protection). At the time many Faculties in Serbia established new departments or study programs covering environmental issues from their scope.

Environmental education at the university level is present in all 17 universities. This study will focus on the activities carried out by the University of Belgrade (UoB). UoB is the largest university in Serbia which offers a bachelor's, master's degree, and Ph.D.'s in different environmental and natural resources perspectives. Each faculty focuses on their scope of environmental issues (Table 3).

#### 3.4. Education for Environmental Citizenship in Bosnia

Environmental education in Bosnia has been severely suppressed by the devastating impacts of the Bosnian civil war between 1992 and 1995. After the Civil War in 1995 Bosnia and Herzegovina (BA) was established as a sovereign state with parliamentary state regulation and a decentralized political and administrative structure [20]. Two Entities (Republic of Srpska and Federation of BA) and one District (Brčko) comprise the three administrative units within BA, and are responsible for all jurisdictions over higher education. The Ministry of Scientific-Technological Development, Higher Education, and Information Society of the Republic of Srpska is the main institutional jurisdiction for higher education and the University of Banja Luka, as a public higher education institution. Considering environmental issues, BA is strongly devoted to international commitments ratifying United Nations Conventions (United Nations Convention to Combat Land Degradation; United Nations Framework Convention on Climate Change; United Nations Convention on Biological Diversity) and implementing many other International agreements and EU Directives into the existing legislative framework [21].

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Table 3. Overview of environmental education and environmental citizenship education at the University of Belgrade.

University	Faculty	Study Program/ 1st or 2nd Level <sup>1</sup>	Courses Title EE/EEC Contents <sup>2</sup>	Enrolled Student
	Faculty of Biology	Module Biology/1st/2nd		
		Module Ecology/1st/2nd	i.e., various environmental courses (EE)	
		Module Professor of Ecology and Environmental Protection/2nd		150
	Faculty of Forestry	Ecological engineering/1st	i.e., Environmental engineering (EE)	60
		Forestry/1st	i.e., Environmental Forestry (EE)	120
		Landscape architecture/1st	i.e., Urban ecology (EE)	60
		Ecological engineering/2nd	i.e., environmental Modules (EE)	
University of Belgrade	Faculty of Chemistry	Environmental Chemistry/1st/2nd	i.e., various environmental chemistry courses (EE)	135
		Biochemistry/1st	i.e., Elective: Ecology (EE)	50
	Faculty of Geography	Geospatial and Environmental Science/1st/2nd	i.e., various environmental courses connected with geosciences (EE)	40
		Spatial Planning/1st	i.e., Ecological Planning (EE)	40
		Tourism/1st	Tourism and nature (EE)	70
	Faculty of Technology and Metallurgy	Environmental Engineering/1st/2nd	i.e., Environmental engineering courses and Sustainable development (EE)	60
	Faculty of Mining and Geology	Environmental Engineering/1st/2nd	i.e., Environmental engineering courses (EE)	40
	Faculty of Agriculture	Environmental protection in food production/1st	i.e., Ecology, sustainable agriculture, environmental protection courses (EE)	40
	Faculty of Physical Chemistry	Physical Chemistry/1st/2nd	i.e., Elective: Environmental Physical Chemistry	100
	Teacher Education Faculty	Educator's education/1st	Getting to know the environment	140
	Pharmaceutical Faculty	Pharmacy—Medical Biochemistry/1st	Toxicological risk assessment, environmental pollutants, elective course: Medicinal plants and the environment	72
	Faculty of Security Studies	Security Studies	Foundations of Environmental Security, elective module: Eco safety	390

<sup>&</sup>lt;sup>1</sup> 1st level = bachelor, 2nd level= master; <sup>2</sup> EE—Environmental Education, EEC—Education for Environmental Citizenship.

The Government of the Republic of Srpska has adopted the Strategy on Development of Education for the period 2016–2021 [22], as the main document which strongly supports and encourages international cooperation between the University of Banja Luka (UBL) and other countries worldwide. UBL has already started implementing EE and EEC into some of the university courses (Table 4). Besides internationalization as the main objective, this document is important for the future integration of the Republic of Srpska (BA) into the European Union. The UBL was established in 1975, is the second-largest university in BA, with more than 15,000 students. It consists of 17 faculties, where environmental education is the part of study programs and curricula on three Faculties (Faculty of Forestry, Faculty of Agriculture, and Faculty of Science). So far, UBL has been involved in 89 Tempus projects, 17 Erasmus+ Capacity Building projects, and more than 90 Erasmus+ credit mobility projects which together with more than 200 bilateral agreements in international

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academic cooperation, represents an excellent baseline for internationalization. Moreover, universities in developing countries such as BA are not visible enough due to limited capacities, particularly in post-conflict environments.

<b>Table 4.</b> Overview of environmental education and environmental citizenship education	at the University of Banja Luka.
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University	Faculty	Study Program/ 1st or 2nd Level <sup>1</sup>	Courses Title EE/EEC Contents <sup>2</sup>	Enrolled Student
University of Banja Luka	Faculty of Forestry	Forest management on sustainable basis 2nd	Environment and Society (EEC)	10
		Forestry 2nd	Environment and Society (EEC)	20
		Forestry 1st	Environment and Society (EEC)	30
	Faculty of Natural science	Ecology and Environment protection 1st	EE curriculum	12
		Biology 1st	EE curriculum	35
		Plant ecology 2nd	EE curriculum	10
	Faculty of Agriculture	Plant protection 2nd	Environment and Society (EEC)	7
		Soil and water management 2nd	Environment and Society (EEC)	6
	Mechanical faculty and Faculty of Architecture, Civil engineering and Geodesy	Energy efficiency in engineering	Environmental engineering (EE)	15

<sup>1 1</sup>st level = bachelor, 2nd level = master; 2 EE—Environmental Education, EEC—Education for Environmental Citizenship.

Before looking into the question of environmental citizens in BA and comparing the environmental awareness, opportunities in the educational institutions abroad, it is important to note that BA ranks in third place in 2020 Human flight and brain drain index in Europe [23], an indicator for the economic impact of human displacement and the consequences for country's development—higher index means greater emigration. BA scores 6.2 and is right behind Albania (8.2) and Moldova (7). The average for Europe from the same period was 3.5, with Sweden having the lowest index of 0.8. In 2018 the Ministry of Human Rights and Refugees of BA reported that the total number of people who live abroad but are originally from BA exceeds half of the total population recorded by BA in the 2013 census. Over 2 million people of BA have moved away [24]. An increasing number of people are trying to study abroad and those newly graduated are seeking opportunities outside of BA, in their effort to ensure advancements, professional development, social security, and stability of the state. The cost of each educated person from BA leaving the country is estimated to amount up to EUR 21,000 [25].

Young people of BA are leaving the country to expand their views and apply for master studies abroad and very few of them return to BA [25]. The losses are not only economic but often emotional, as the youth becomes a victim of the politicized educational system. While the concerns for students in BA are topped with the question of recognition of diplomas across the country from some of the institutions, UNESCO [26] warns that the current educational system in BA enhances the ethnic division of children and students.

Motivated by the concept of environmental citizenship some people of BA are enrolling in the Iceland School of Energy Master program. The program provided an ideal opportunity to enlarge the perspective while learning about environmental issues and acquiring know-how on sustainable development.

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## 4. Frameworks for International Collaboration to Enhance Education for Environmental Citizenship

The opportunities for academic staff and students rely on international programs to provide logistical, structural, and financial support to facilitate collaborative projects as well as international student and staff exchanges. Numerous programs are offering financial support for projects (educational and/or research) and mobility, like Erasmus+, EEA Grants and Norway Grants, CEEPUS, or COST.

The European Commission has implemented the Erasmus+ Programme to support education, training, youth, and sport in Europe for the period 2014–2021 [27], to boost skills and employability, as well as to promote environmental education. The program financed both collaborative and mobility projects, for: higher education; vocational education, and training: school education (including early childhood education and care); adult education; youth and sport. For high education level mobility, Erasmus+ was based on the two key action projects:

- key action 103 (known as KA103)—for which HEIs from the program countries are eligible, including Iceland, Romania, and Serbia;
- key action 107, (known as KA107)—financing credit mobility projects between the program countries HEIs and other partner countries, all over the world, including Bosnia and Herzegovina.

The new Erasmus+ Programme (2021–2027) will provide opportunities for over 4 million Europeans to study, train, gain work experience, and volunteer abroad.

The EEA Grants and Norway Grants are grants funded by Iceland, Liechtenstein, and Norway with the aim to reduce social and economic disparities in the European Economic Area (EEA) and strengthen bilateral relations with the 15 EU countries in Central and Southern Europe [28]. The main objective of the EEA grants is the strengthening of fundamental European values such as democracy, tolerance, and the rule of law. Furthermore, and linked to the promotion of democracy and rule of law is the promotion of environmental education and sustainable development.

Central European Exchange Program for University Studies (CEEPUS) is a multilateral university exchange program in the extended Danube region based on an International Agreement. More than 15 member states have joined the current CEEPUS III agreement [29], including Bosnia and Herzegovina, Romania, and Serbia.

Apart of the educational programs, there are framework programs financing research and innovation, but all of these include educational chapters in their projects.

The European Cooperation in Science and Technology (COST) is a funding organization for research and innovation networks [30]. COST is operated according to the instrument called COST Action, which is a network dedicated to scientific collaboration, complementing national research funds. In this context, universities from Iceland and Balkan states in southeastern Europe are collaborating and joining their efforts in the COST action project for education for environmental citizenship. The European Network for Environmental Citizenship (ENEC), is one of the COST actions, in which 32 countries are participating, including 30 European Countries, Israel, and the USA [4]. The ENEC project is aiming to improve understanding and assessment of environmental citizenship and education for environmental citizenship in European societies and participating countries, being organized in four working groups:

- WG1: Environmental Citizenship through Primary Formal education;
- WG2: Environmental Citizenship through Primary Non-Formal education;
- WG3: Environmental Citizenship through Secondary Formal education;
- WG4: Environmental Citizenship through Secondary Non-Formal education.

Horizon 2020 and Horizon Europe are the eighth and ninth, framework programs (FP8 and FP9) funding research, technological development, and innovation in Europe, respectively. The programs are instruments to promote and facilitate the Innovative Union initiative. The aim is to ensure the creation of world-class European science and to facilitate

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cooperation between the private and public sectors in the field of innovative work. It is also focused on the further development of the European Research Area as a single market for knowledge, research, and innovation.

Finally, various bilateral and multilateral cooperation projects financially support projects of scientific and technological cooperation between scientific research organizations based on international bilateral or multilateral agreements.

These exchange programs all aim at enhancing education for environmental citizens at all Universities involved. Most programs have a special fund focusing on Inclusiveness Target Countries, like Serbia, Romania, and Bosnia, facilitating the introduction of Environmental Citizenship and Education for Environmental Citizenship.

#### 4.1. International Collaboration Experience of Reykjavik University

Iceland and Reykjavik University are depending on intense collaboration with Europe and North America. Being isolated in the North Atlantic, collaboration is essential for capacity building, knowledge transfer, and the development of innovation. While Iceland has extensive knowledge in hydropower and geothermal energies, sustainable fisheries, and aluminum and ferrosilicon, it also relies on incoming expertise from outside the country. Being a member of the EEA Icelandic institutions can participate in both EEA research and mobility grants and programs funded by the European Union.

In the following, we outline how international collaboration enhances education for environmental citizens at Reykjavik University (RU) and how the funding programs described in Section 3 have facilitated international collaboration. Reykjavik University welcomes every year over 150 Erasmus students and about 35 students that subscribe to a full Master's program at the Iceland School of Energy.

Reykjavik University has been actively collaborating with the Balkan states Romania, Serbia, and BA, namely Transilvania University of Brasov (Romania), Politehnica University of Timisoara (Romania), University of Belgrade (Serbia), and University of Banja Luka (Bosnia and Herzegovina). With all mentioned universities collaboration ranges from student and staff exchange, development of joint educational and research projects, to joint publications.

Especially the international exchange though the Cost Action ENEC has initiated the incorporation of EEC into the curriculum of some of the university courses (Table 1). Lecturers from Balkan countries were invited to Iceland and vice versa, both included concepts of EEC. Furthermore, through the staff exchange, teaching material was exchanged and EE, as well as EEC, was incorporated into the guest lectures (Tables 2–4).

Furthermore, the student exchange has led to the development of student projects from various parts of the world, bringing international concepts to Iceland and educating international students with Icelandic know-how. Through the incorporation of EE and EEC into university courses, environmental awareness was disseminated across the world.

#### 4.2. International Collaboration for Environmental Citizenship of Romania

Between 2014 and 2020, Politehnica University of Timisoara (UPT), in cooperation with Institutions from Iceland, organized a series of meetings covering subjects such as environmental citizenship, sustainable land management, renewable energy, ecosystem services. Furthermore, since 2017 UPT, Reykjavik University (RU), University of Banja Luka (BA), and Institute for Multidisciplinary Research, University of Belgrade (Serbia) are cooperating within the above-mentioned COST Action CA16229 "European Network for Environmental Citizenship (ENEC)".

The meetings brought together representatives of local and regional authorities, high-school educations, SMEs, and NGOs. These meetings allowed an efficient transfer of knowledge between different actors, decision-makers at local, regional, and national levels and led to the strengthening of international relations.

At the institutional level, the exchange of staff and students had an important role in disseminating knowledge and expertise in identifying new common directions of reSustainability **2021**, 13, 10326 11 of 17

search/collaboration in terms of environmental awareness and implementing the concept of environmental citizenship in different regions, respectively. Numerous former students are currently employed in environmental sectors, indicating that the transfer of knowledge to the economic sector was successful.

Transilvania University from Brasov (UNITBV) is a prestigious institution both at a national and international level, a comprehensive university with 18 faculties, covering all fundamental domains, such as engineering sciences, exact sciences, social sciences, arts and humanities, medicine, physical education, and sports. One of the priorities of the UNITBV management is to intensely promote internationalization activities, stated in the internationalization strategy [31]. The international collaboration with other HEIs all over the world (Africa, North America, Latin America, Asia and Oceania, and Europe) is based on projects agreements (such as Erasmus, EEA, and CEEPUS) or on mutual framework agreements signed between the partners [32].

UNITBV and RU successfully applied for the project "Protecting biodiversity and the importance of ecosystem services" funded by the Fund for Bilateral Relations within the RO 02 program "Biodiversity and ecosystem services", Financial Mechanism of the European Economic Area (EEA) 2009–2014. The main objective of this project was to identify sustainable solutions to protect biodiversity, for acknowledging, understanding, and judicious using of ecosystem services through activities adapted to different age groups including adults, children, and young people through an inter-generational approach.

The partnership of UNITBV with RU and the idea of cooperation based on a project emerged after the participation of representatives from RU, Bucharest University of Economic Studies (BUES), and UNITBV at one workshop, in May 2017. Common educational training experiences and needs were identified, and thus the three teams decided to start collaboration for possible future educational projects. To prepare an educational project application, in January 2019 a Preparatory visit was organized for UNITBV and BUES groups at RU, with financial support from the European Economic Area (EEA) Financial Mechanism 2014–2021 and the Erasmus+ mobility projects. As a consequence of the discussions during the preparatory visit, in January 2020 the consortium formed by RU, UNITBV, BUES together with the Technical University Gheorghe Asachi from Iași (TUIASI) applied for a cooperation project, with the title Environmental Education—OERs for Rural Citizens (EnvEdu—OERs), as indicated in Figure 1. The project proposal was granted and started in November 2020 [33].

During the meetings that the UNITBV team had with local authorities' representatives before the project proposal, it was pointed out that the rural citizens' education related to the environment quality at the local community level is low. A list of environmental legislation, compulsory to be implemented at the local communities' level, was provided by the local authorities to the UNITBV team. This list contains legislative acts mostly related to (i) waste management in small communities; (ii) the need for active participation of the population at Environmental Impact Assessment (EIA) reports debates. Thus, the project aims to develop open educational resources (OERs) for environmental education for rural citizens and will answer to the increased need to ensure social, food, and environmental security for the rural communities, as a hotspot for designing sustainable development practices at the local level.

The project partners will manage an e-learning MOODLE platform, where OERs will be uploaded and available, organized on six modules (M):

- M1. Sustainable Communities and Social Communication (under the coordination of UNITBV);
- M2. Environment Quality (under the coordination of UNITBV);
- M3. Environmental Management, Impact and Risk Assessment (under the coordination of TUIASI);
- M4. Waste Management in Rural Communities (under the coordination of TUIASI);
- M5. Water Resources and Water Balance for Sustainable Community (under the coordination of RU);

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#### • M6. Environmental Projects Management (under the coordination of BUES).

The project team considers that all the OERs, the meetings organized at local communities, the project website, all the communication, and dissemination envisaged activities will contribute to the environmental education citizenship in Romania and Iceland. The partners' competencies, expertise, and experience are complementary, thus ensuring a knowledge transfer among the HEIs as well to the local communities.



**Figure 1.** Ongoing international collaboration between Reykjavik University and high education institutions from Romania.

#### 4.3. International Collaboration of Belgrade University

International collaborations aim to facilitate capacity building and foster collaboration. The University of Belgrade has maintained intense and productive collaborations with universities around the world, to affirm the policy of friendly and constructive academic ties and to promote international exchanges of teachers, students, and administration.

University of Belgrade and Reykjavik University have developed an intense student and staff exchange between the two institutions, resulting in joint research projects, joint conference proceedings, and joint research publications in the field of environmental science. During the exchange academic staff of both institutions have provided lectures to local students, promoting environmental education.

#### 4.4. International Collaboration of Banja Luka University

The international collaboration between Banja Luka University and Reykjavik University has been postponed due to the COVID-19 pandemic that started in January 2020. However, numerous courses have been identified in the curriculum of both universities (Tables 1 and 4) that could potentially lead to a collaboration on environmental education. The two universities have successfully applied for an Erasmus+ grant and will start a teaching and research collaboration as soon as travel restrictions are lifted.

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### 5. Key Drivers for Enhancing Environmental Education and Awareness in Balkan Countries

In the Balkan states in southeastern Europe, such as Romania, Serbia, Bosnia and Herzegovina, environmental education is not recognized as a priority, because society and economy still rely on a historically traditional form of exploitation of natural resources in an unsustainable manner. Although formal and non-formal environmental education exists, the application of knowledge in practice is based on individual efforts. Even when initiative and action exist in individuals or groups, the state, i.e., the system hampers these actions to expand their outreach, reducing their impacts and minimizing their success. This is especially true for the energy sector, where renewable energy sources could be cheaper, healthier, and environmentally friendlier than the widely used coal for heating purposes.

Formal environmental education is implemented by including environmental courses in the curriculum of schools and universities, generating a major channel of dissemination of environmental knowledge. Research and environmental initiatives endorsed formal education as a way of educating the public and students with sound environmental knowledge and achieving behavioral change [6]. In order to facilitate the incorporation of environmental courses, international collaboration plays a key role, facilitating the dissemination of environmental knowledge through projects and exchange programs by enabling the exchanges of knowledge and real-life examples.

Environmental education in BA receives more attention in the recent decade due to serious threats and ongoing climate changes that affect this region very frequently. Floods, drought, and wildfires are recognized as the main drivers of environmental degradation in BA caused by climate changes [34–37]. For example, the University of Banja Luka (UBL) implemented the Erasmus project entitled "Soil Erosion and Torrential Flood Prevention: Curriculum Development at the Universities of Western Balkan Countries" focused on improving the existing education system in the forestry study program, aimed to update curricula and answer on torrential floods and soil erosion not only among students but also for practitioners who manage forests and forest land. Through this project, UBL strongly benefits from experience and knowledge exchange among project partners from developed countries in Europe promoting the importance of international collaboration for a better environment. Priority of environmental education at UBL is to update existing curricula in line with recognized threats for the environment, transfer knowledge to a wider community and to establish a better connection between science and practice. However, the post-conflict environment and limited capacities (lack of staff, equipped laboratories etc.) additionally challenge this process, but international collaboration with eminent universities worldwide has been recognized as an opportunity for the development and promotion of UBL in the future.

Academic cooperation provides the framework for ensuring a sustainable mutual transfer of knowledge thus contributing to enhancing environmental awareness as well as to the innovative strength of concepts such as environmental citizenship.

In order to find out the perception of who is responsible to provide environmental education, a survey was organized and launched to persons well aware of exchange programs, EE and EEC. Seventy-five persons of different ages and origins took part in the survey: 42 Icelanders, 23 people of BA, and 10 of other nationalities. They were asked seven questions, aiming to tackle their experience of formal education and learning about the environment. The questions are grouped as follows:

- (1) where they studied and if their formal education taught them (sufficiently) about the environment:
- (2) if they self-evaluate as sufficiently aware of the environmental concerns and about the sources of their information;
- (3) if the environmental awareness is a matter of public or private life, or how they were raised at home.

Self-evaluating their experience by responding to the statement "School taught me everything I know about the environment, participation in environmental protection

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and exercise of environmental rights", 60.87% of the respondents from BA said that it is "somewhat" correct; 13.04% answered that it was not taught at all in schools and 26.09% answered that they learned all they know about the environment at school. In comparison, of all the Icelanders who took part in the survey, 59.52% stated that these concepts were not taught in school at all. Almost similar to the Icelandic situation, 50% of the participants from other countries stated that the concepts were not taught in schools.

While all the respondents consider themselves more or less well informed about the global and local environmental concerns, only one person from BA and two Icelanders of all participants in the survey identified schools as a source of information and awareness. Media, personal interest, and personal research are the main sources of information (Figure 2).

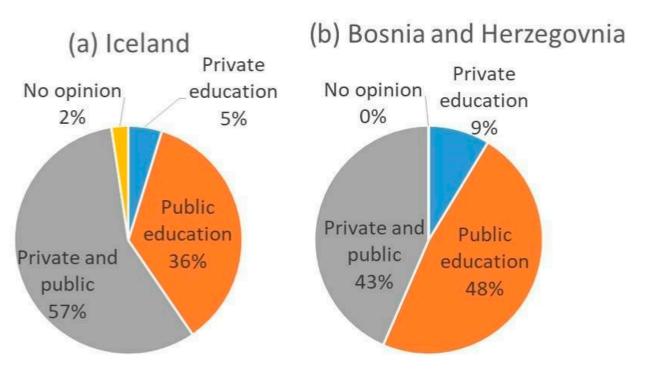


Figure 2. Perception on who is responsible to provide environmental education to children and students.

Most of the people of BA participating in the survey believe that environmental awareness is a public matter that should be addressed by the system (48%), while for Icelanders the concern is of both public and private matters (57%).

The results from the survey reveal a strong desire from students from BA for environmental education in the public education system. In comparison with Iceland, more people of BA feel that environmental education should be part of public education. While it would be interesting to further expand the study, include representation of all social and age groups, and understand what exactly is taught behind school benches and auditoriums at universities. Whether they feel free and if the complex, fragmented political system allows them to do so, seems to have a greater impact on the final decision use of that potential in BA.

#### 6. Conclusions

This paper analyzed how international collaboration facilitates the introduction of environmental education and education for environmental citizens into the curriculum of universities in Iceland, Romania, Serbia, and Bosnia. For this purpose, data on courses including environmental education were collected from representative universities of each country. The process of integration of EE into the university curriculum was analyzed using a SWOT analysis in each country. Furthermore, the international collaboration between the representative universities from the four countries was described and analyzed. Finally,

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students aware of EE and EEC were asked about their perception of EE. Based on the presented results the following conclusions can be drawn:

- EE is well incorporated into the university curriculum of all investigated universities. Nevertheless, enrollment of students is still very low, with about 3% (of the total number of students) at Reykavik University, and less than 2% in the Balkan Universities;
- EEC is in all universities a new concept and has only been incorporated into some EE courses since the start of the Cost Action ENEC. Nevertheless, all universities have been doing an effort to incorporate EEC into the curriculum;
- Numerous funding programs facilitate the collaboration between more affluent countries, such as Iceland, and economically weaker countries, as some of the Balkan countries. Most of these funding programs promote sustainable development and facilitate the promotion of environmental education;
- The international collaboration between Reykjavik University in Iceland, an affluent country (GDP per capita: USD 65,273), with the Balkan Universities (GDP per capita: USD 14,968 in Romania, USD 8748 in Serbia, USD 6728 in Bosnia) is very productive and has led to a valuable exchange of knowledge, capacity building, and joint research projects. Especially the incorporation of the concept of EEC has been facilitated through the international collaboration funded by the Cost Action ENEC;
- A key driver for international exchange is the funding opportunities for young students and researchers. Student exchange programs present a unique opportunity for ambitious students to acquire valuable know-how on sustainable development;
- The majority of the students that are aware of exchange programs, EE and EEC believe that it is at least partially the responsibility of the state to provide environmental education to children and students.

Based on these findings we conclude that funding for international collaboration on EE and EEC is of fundamental importance to promote and facilitate the implementation of the concepts of the environmental citizen into the curriculum of universities.

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**Dedication:** This manuscript is dedicated to Heidi Anastasia Finger, born on 23 March 2020 in Belgrade, Serbia.

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