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METHODOLOGICAL PROPOSITION FOR EDUCATION (PR6)

Leading organization:

CSCI, Italy

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Methodology for Implementing the European Framework of OpenPass4Climate within Educational Contexts (prior to Higher Education)

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Information

Project	Impact evaluation of eco-pedagogy towards Individual and Collective Engagement through the implementation of a European Open Badges Passport for Climate and Planet – OpenPass4Climate
Project Nº	2022-1-FR01-KA220-HED-000089354
Work Package	Work package n°5 – Impact evaluation, enlargement & policy recommendations
Date	June 2025
Type of Document	Report
Language	English

Consortium

UniLaSalle Institut Polytechnique

NOVA UNIVERSITY LISBON

Universidad de Valladolid

UNICA Network of Universities from the Capitals of Europe

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INTRODUCTION

This report examines the intersection of green policies, climate change, and the education sector within the framework of the Erasmus+ OpenPass4Climate (OP4C) project (2022-1-FR01-KA220-HED-000089354).

As the urgency of addressing climate change intensifies globally, education is increasingly acknowledged as a vital instrument for raising awareness, fostering sustainable behaviours, and equipping future generations with the knowledge and competencies needed to take meaningful, informed action.

The first section provides the analysis to the European level, outlining the European Union's strategic priorities and funding mechanisms that support climate education.

The second section reviews the national efforts of the OpenPass4Climate project partners (Italy, Belgium, France, Portugal, and Spain), offering a comparative view of their approaches and contributions to integrating sustainability into formal and non-formal education systems.

The third section introduces the OpenPass4Climate platform and the OpenPass4Climate Passport—digital tools designed to achieve and showcase students' climate-related learning through the use of Open Badges. These instruments aim to support lifelong learning, validate informal and non-formal educational experiences, and enhance visibility of individual engagement with climate action.

The last section forms the core of this report, presenting the methodological contribution developed through the OpenPass4Climate project. Drawing on insights gathered from national focus groups, it explores how the OpenPass4Climate platform can be effectively implemented in schools, identifying key opportunities, challenges, and practical recommendations for integration into curricula and extracurricular activities.

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1. GREEN POLICIES AND CLIMATE CHANGE EDUCATION IN EUROPE

This section examines the role of public policies in supporting climate change education in Europe, highlighting key initiatives from OpenPass4Climate partners' countries and challenges in preparing students to address the climate crisis.

1.1. EU policies supporting climate change education

The European Union has established a cohesive framework for climate change education, prioritizing sustainability and environmental awareness across member states. This framework is reinforced through key policies such as the European Green Deal and alignment with the United Nations' Agenda 2030.

The European Green Deal was adopted in 2019 and it emphasizes education as a crucial component in achieving climate neutrality by 2050. The Deal outlines how fostering environmental awareness and equipping educators with updated resources are key to creating sustainable schools. Initiatives like the climate pact education focus on engaging students and teachers in actionable local climate solutions, encouraging cross-sector collaboration to embed sustainability into educational systems. These actions make climate education a fundamental pillar of Europe's broader environmental goals. The EU's approach aligns with the United Nations' Agenda 2030, particularly focusing on SDG 4.7, which emphasizes quality education on climate change, biodiversity, and sustainable consumption. Programs such as Erasmus+ and Horizon Europe promote cross-border collaboration and share best practices among member states. These initiatives ensure that both educators and students are prepared to address global environmental challenges while aligning with sustainable development goals.

However, challenges remain in the widespread implementation of effective climate education across Europe. One of the most significant barriers to climate change education is the lack of a unified European framework. This leads to varying levels of depth and quality in climate education across member states. In fact, a 2024 European Investment Bank survey found that younger generations have a less thorough understanding of the causes and consequences of climate change than the over-30s, further underscoring disparities in climate change education within the EU (Europeans over 30 understand climate change better than younger generations, EIB survey finds).

While urban areas in Europe are increasingly equipped with the necessary tools for effective climate education, rural schools often face challenges due to limited access to digital resources and modern technologies (Overcoming the digital divide in rural areas | European School Education Platform).

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This digital divide can hinder both teacher training and student engagement, making it difficult for underserved regions to fully participate in climate change education programs.

1.2. EU funding programs and innovation in climate education

Funding programs at the EU level provide financial support for climate education across Europe, facilitating the implementation of green initiatives in schools and universities.

Erasmus+ acts as a flagship program, dedicating 30% of its 2021-2027 budget to sustainability, with over 230,000 projects being supported across Europe. It promotes the exchange of sustainable practices, teacher training, and collaboration among educational institutions, making sustainability a key focus in European education systems.

With a budget of €93.5 billion for 2021-2027, Horizon Europe is the EU's leading framework for research and innovation. It promotes advances in renewable energy, sustainable urban planning, and climate adaptation. Horizon Europe ensures that these innovative solutions are integrated into higher education curricula, preparing students to address the pressing environmental issues of the future.

Another important initiative is represented by the LIFE Programme, which has co-financed since 1992 more than 5,500 projects, investing over €12 billion in environmental initiatives. The program helps schools integrate sustainability practices, such as eco-friendly gardens and water conservation projects, thereby fostering environmental awareness through hands-on education.

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2. National initiatives in partners' countries for climate change education

National governments play a key role in implementing climate education programs that align with broader EU policies. These initiatives address regional needs and provide tailored solutions to encourage sustainability practices. This part examines the key initiatives from OpenPass4Climate partners' countries in climate change education.

2.1. Italy

Climate change education has gained in Italy increasing importance as part of the country's commitment to achieving sustainability goals outlined in the European Union's Green Deal and United Nations' Agenda 2030 (The 2030 Agenda and the Sustainable Development Goals). National policies aim to integrate environmental education into school curricula and foster a culture of sustainability across all educational levels.

The Italian Ministry of Education has made significant strides in embedding environmental education in the national curricula. This includes integrating topics related to climate change, biodiversity, and sustainable consumption in various subjects. "Civic Education" was reintroduced from 2020/2021 (law 92/2019) as a compulsory subject and replaced the previous "Citizenship and Constitution", mandating 33 hours of annual civic education, with a strong emphasis on sustainability and climate change. The guidelines align with the United Nations' Agenda 2030, specifically with SDG 13 on Climate Action, and advocate for interdisciplinary approaches that combine theory with practice.

This integration of climate change education as a central theme in Italian schools is reinforced by national initiatives that engage schools in hands-on environmental projects in collaboration with NGOs and local governments. These projects aim to deepen students' understanding of sustainability, allowing them to actively participate in addressing local and global climate challenges.

Among the initiatives is the national document issued by the Ministry of the Environment (*MASE*), which promotes environmental education across all educational levels. This initiative encourages hands-on activities, such as school gardens, fieldwork, and civic projects, to enhance awareness, responsibility, and sustainability. Key topics include climate change, biodiversity, the circular economy, and energy, all aimed at cultivating active and conscious citizens.

This approach aligns with findings from a recent Eurydice report, which offers a comparative overview of how European countries, including Italy, are integrating sustainability education into their school systems. The document underscores the significance of cross-curricular integration, active learning, teacher training, and collaboration with local communities. Italy is recognized for

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implementing structured strategies to promote environmental awareness and responsible citizenship through education.

Additionally, the ISPRA Program for Environmental Education and Sustainability 2024/25 proposes a national calendar of school initiatives that blend scientific knowledge with experiential learning. Through contests, workshops, and multimedia campaigns, the program raises awareness regarding environmental protection, energy transition, and biodiversity. It emphasizes outdoor and cooperative learning, encouraging students to reflect on the ecological impact of their actions and to develop a proactive and environmentally responsible mindset.

Another noteworthy initiative is the national program *RiGenerazione Scuola*, promoted by the Italian Ministry of Education. This program aims to foster environmental education and sustainability through a systemic and transformative approach. It focuses on four key pillars: knowledge, behaviors, infrastructures, and opportunities, while promoting school involvement in activities such as circular economy projects, green space regeneration, and sustainable mobility. By supporting student engagement through experiential learning, outdoor education, and community partnerships, the initiative aspires to build environmental awareness, critical thinking, and civic responsibility among students at all educational levels.

Moreover, there are some school-based projects: Italian schools participating in the Eco-Schools program engage students in sustainability through activities like composting, energy conservation, and biodiversity gardens (Il Programma internazionale Eco-Schools). In partnership with Corteva Agriscience, the "Climate Change Kit" (Associazione Stampa Agroalimentare Italiana article) was distributed to 610 schools, helping students and educators address climate challenges through hands-on projects like energy audits and creating green spaces.

The success of climate education depends significantly on well-trained educators who can effectively communicate complex environmental issues to students. In Italy, various teacher training initiatives have been developed to equip educators with the necessary skills and knowledge to teach climate change effectively.

Training initiatives such as the Climademy project (https://climademy.eu), that is a European initiative that provides free resources and courses for secondary school teachers, focusing on climate topics such as energy transition, natural resource management, and climate adaptation. The project utilizes interactive tools like simulations and digital platforms to engage students in learning. It also aims to create a community of educators dedicated to climate education by sharing best practices and teaching materials. In Italy, the Golinelli Foundation and the University of Bologna coordinate the project, with a goal of training 2,000 secondary school teachers between 2023 and 2025

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(CLIMADEMY - LA PROFESSIONE DELL'INSEGNANTE NELLA SOCIETÀ DELL'ACCELERAZIONE E DELL'INCERTEZZA).

Another initiative is represented by Rete Scuole green network (La "Rete Nazionale Scuole Green" in Italia e gli elementi chiave e la creazione di una coscienza ambientale nelle giovani generazioni: in allegato un progetto operativo). This network has been instrumental in offering interdisciplinary teacher training. Through workshops and case studies, teachers learn how to integrate sustainability into school curricula. Since its inception, the network has grown significantly, with over 800 participating schools nationwide, which indicates Italy's growing commitment to sustainability education.

Students are important stakeholders that play a pivotal role in climate change education, not only as learners but also as active agents of change. Through their involvement in activism, practical projects, and leadership, students are becoming key drivers of sustainability initiatives and environmental justice.

Youth-led initiatives such as Fridays for Future have showcased the power of collective action in demanding climate justice. Students across Europe, including in Italy, have mobilized through protests, social media campaigns, and direct actions, urging for the integration of climate change and sustainability into school curricula. These movements have become vital in advocating for climate action and influencing policymakers to prioritize environmental education.

Beyond activism, students across both Europe and Italy actively participate in practical projects that bridge classroom learning with real-world solutions. Reforestation campaigns, energy conservation projects, and community clean-up initiatives are just some examples where students are taking the lead.

Students are increasingly involved in leadership roles related to climate change and sustainability. For example, youth organizations such as Young Friends of the Earth Europe (YFoEE) bring together youth groups working on social and environmental justice, organizing educational activities and awareness campaigns. In schools across Europe, sustainability councils have emerged, providing students with valuable leadership opportunities while fostering a culture of environmental responsibility. Similarly, Italian students are becoming key players in local sustainability efforts, working with NGOs and government agencies to tackle community-specific climate issues (School Project | Italian Climate Network).

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2.2. Belgium

Belgium's climate change education initiatives are shaped by its linguistic and regional diversity, with distinct strategies implemented in Flanders, Wallonia, and the Brussels-Capital Region. These efforts are designed to align with broader EU objectives while addressing local educational and environmental priorities.

In Flanders, the Milieuzorg Op School (MOS) programme has played a central role in promoting environmental and climate education since its launch in 2002. MOS provides structured support to schools in integrating sustainability into their curricula and campus practices. As of 2023, around 50 percent of Flemish schools participate in MOS, which offers tools such as school CO_2 calculators, greening schoolyards, and outdoor learning modules focused on climate issues.

The programme has evolved to emphasize affective and participatory learning methods. This includes hands-on activities, student engagement in environmental projects, and experiential outdoor education, which have shown positive impacts on both knowledge and behaviour among learners.

In Wallonia, climate change education is integrated within broader regional sustainability strategies. The Circular Wallonia programme, introduced in 2021, includes education and training as one of its key pillars. It promotes awareness and skill development related to the circular economy, focusing on waste prevention, reuse, and innovation. Educational activities under this strategy target not only schools, but also communities and local businesses.

Complementing this, the Digital 4 Circular Wallonia campaign (2022–2024) has introduced webinars, workshops, and digital training content to foster understanding of the circular economy and climate change, particularly among youth and educators.

The region also supports environmental education through networks such as the Centres Régionaux d'Initiation à l'Environnement (CRIE), as well as civil society actors. These organisations facilitate classroom activities, teacher training, and public awareness projects.

Additionally, the Wallonia-Brussels Federation committed €1 billion in 2023 to school renovation projects that include environmental and climate-related educational components, linking infrastructure improvements with educational transformation.

In the Brussels-Capital Region, climate education is supported through participation in the Eco-Schools network and local initiatives such as the Bubble platform. Between 2013 and 2017, more

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than 700 classroom groups took part in themed environmental sessions. The Bubble network, active since 2013, encourages schools to share best practices, participate in green school projects, and engage in professional development related to sustainability education.

At the federal level, Belgium supports climate education through targeted initiatives and digital tools. The Federal Climate Change Service delivers the "Climate Challenge @ School" programme, which involves interactive workshops led by climate scientists. As of mid-2022, over 115 sessions had been held across the country.

The federal platform My2050.be provides an interactive tool allowing students to explore scenarios for reducing Belgium's greenhouse gas emissions by 2050. The tool is accessible in Dutch, French, and English, and is used in secondary schools to support climate literacy.

Belgium's national and regional initiatives reflect a comprehensive, multi-level approach to climate change education, marked by several notable strengths. These include a broad reach across school systems, particularly through the widespread implementation of the MOS programme in Flanders and the active role of environmental education networks throughout the country.

Climate education is increasingly integrated with wider sustainability strategies, including infrastructure upgrades and the promotion of the circular economy. The use of digital tools, interactive platforms, and hands-on learning methods enhances student engagement and encourages learner agency. A key feature of Belgium's approach is the strong collaboration between federal and regional governments and civil society organisations, ensuring coherence and local relevance.

Looking ahead, current developments focus on reinforcing the behavioural impact of these initiatives by fostering long-term sustainable practices among both students and educators.

2.3. France

The Loi de Transition Énergétique mandates the inclusion of climate education in French schools. This law integrates topics such as renewable energy and biodiversity into Science, Geography, and Civics. Programs like Ecole Verte encourage hands-on activities, such as waste reduction, school gardens, and energy projects, fostering environmental responsibility among students.

The Education for Sustainable Development (*éducation au développement durable* - EDD) in France is a national educational policy that seeks to integrate sustainability into all aspects of school life, from teaching to school management and its relationship with the environment. This strategy is

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implemented from primary education to high school and is supported by a transversal approach that addresses climate change, biodiversity, the circular economy and the energy transition (Ministère de l'Éducation nationale, 2023). To recognize the commitment of the institutions, the Ministry of Education grants the Label E3D (School/establishment in sustainable development approach), an official certification for centers that develop actions consistent with the Sustainable Development Goals (SDGs). Schools that receive this seal not only adapt their curricular content, but also promote the active participation of students and encourage sustainable management of the center, integrating the entire educational community in a continuous process of ecological improvement (Réseau Canopé, n.d.).

In addition to these foundational policies, France has expanded its approach to include innovative tools and multi-level programs. The National Strategy for Environmental and Sustainable Development Education (SNEE), revised in 2020, reinforces the EDD by extending it to all education levels and promoting a systemic vision of sustainability learning (Éducation.gouv.fr, 2020). Furthermore, from 2020, all secondary schools are required to appoint eco-delegates (éco-délégués), who lead concrete environmental actions and foster peer engagement in ecological practices (Ministère de l'Éducation nationale, 2023).

In higher education, the National Climate Education Action Plan, launched in 2022, requires universities to integrate sustainability into all curricula and staff training (MESR, 2022). Alongside institutional strategies, collaborative tools like La Fresque du Climat have become widespread, offering participatory workshops to help students and professionals grasp climate systems and transition challenges (Fresque du Climat, n.d.). The national agency ADEME supports these efforts by offering MOOCs, educational kits, and funding for local awareness campaigns (ADEME, n.d.).

Lastly, the French government has committed to training 100% of public servants on ecological transition by integrating environmental content into the public sector training ecosystem (Ministère de la Transition écologique, 2022).

2.4. Portugal

Portugal has many initiatives in the area of climate change education that aim to raise awareness, among the educational community - students, teachers, and the community -, for climate crisis, and to promote sustainability action.

There are some initiatives promoted by the Ministry of Education:

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Estratégia Nacional de Educação Ambiental | Agência Portuguesa do Ambiente (ENEA) - Portugal's National Plan for Environmental Education - promotes an active citizenship in climate change, sustainability and climate changes mitigation education, through practical projects such as tree planting and beach cleanups.

Participatory educational projects like ClimActiC, that involve primary and secondary education students in collective action of climate adaptation in the community, promoting environmental citizenship and youth participation.

There are many other initiatives that promote environmental citizenship education, transversal to the different levels of education, focused on ethics, citizenship, problematization of the global environmental crisis, according to curriculum guidelines and national strategies.

And then there are also other initiatives promoted by NGOs and government bodies, both national and local levels:

Associação portuguesa de educação ambiental - ASPEA - Portuguese Environmental Education Association - founded in 1990, works to promote environmental education in Portugal through voluntary actions that include the dissemination of information to secondary schools, the creation and distribution of educational materials, teacher training, financial support for school projects, dissemination in academic media and facilitating the exchange of knowledge between its members through an active network and field trips. ASPEA is also actively involved in international networks and programs such as Caretakers of the Environment International, GREEN and Young Reporters for the Environment, in addition to publishing a quarterly newsletter and organizing an annual 3-day conference for teachers and other environmental education experts.

UNICEF Portugal and the Directorate-General for Education challenge, every year, educational communities to develop projects in climate change area, in order to promote reflection and collective action towards a sustainable future.

Liga para a Proteção da Natureza (LPN): offers training and pedagogical tools for teachers, integrating science, technology and environmental education, all aligned with Portugal's National Plan for Environmental Education.

Schools, also, collaborate with local governments and NGOs to access necessary resources, while teacher training programs equip educators with innovative strategies to engage students in sustainability efforts.

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These initiatives combine formal education with community action and educators training, in order to create a better sustainability and climate action culture, conscience and sense of action.

2.5. Spain

Spain demonstrates strong institutional alignment with EU and UN frameworks through systematic integration of Education for Sustainable Development (ESD) into its educational structure. The 2020 LOMLOE education law represents a significant milestone, explicitly incorporating ESD and global citizenship education, including climate transition components, into all mandatory subjects and teacher training programs.

This legislative foundation was operationalized through subsequent Royal Decrees in 2022 for Primary and Secondary education, which established minimum sustainability content requirements. Primary curricula now incorporate responsible consumption principles and climate awareness, while Secondary curricula address climate change causes, mitigation strategies, and adaptation measures across science and social studies subjects. The new Vocational Training law (Ley 3/2022) further strengthens this framework by making sustainability a compulsory module titled "Sostenibilidad aplicada al sector productivo" across all medium and higher vocational training cycles.

Recognizing the critical role of educators in implementing these changes, the Spanish Ministry of Education has mandated professional development in sustainability. The national Environmental Education and Sustainability Action Plan (Plan de Acción de Educación Ambiental y Sostenibilidad, PAEAS 2021–25) explicitly calls for teacher training programs aligned with transformation needs.

Practical implementation includes new online courses, such as the “2024 Sustainability applied to the productive sector” program for vocational training teachers, developed in coordination with Naturgy Foundation, alongside ongoing training modules. However, current course offerings primarily target vocational educators, with broader teacher training in active, project-based methodologies remaining inconsistent across regions. Non-governmental organizations supplement official channels through initiatives like Teachers For Future Spain, which provides informal climate education modules for school staff.

The aforementioned PAEAS plan (2021–25) directly connects to Spain's Agenda 2030 commitments and the national "Declaration on Climate and Environmental Emergency." Within education, PAEAS Axis 3 on “Integration of sustainability in the education system” establishes specific goals for curriculum integration, teacher training, school renaturalization, and community connections. These

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objectives align with the National Education for Sustainability Strategy (España Educación 2030) under the broader Agenda 2030 framework.

Regional governments have developed complementary plans, including Andalucía's Plan de Educación Ambiental and Cataluña's Estrategia de Educación Ambiental. Municipal authorities contribute through local sustainability commitments that specifically include educational institutions, creating a multi-level governance approach to ESD implementation.

Spanish schools engage in sustainability practices through diverse formal networks and grassroots projects that connect educational institutions with their broader communities.

Eco-schools networks: Regional green school networks operate across Spain, with each region maintaining its own sustainable schools network. Andalucía's Red Andaluza de Ecoescuelas mobilizes schools to implement environmental projects involving entire communities. Cataluña's Xarxa d'Escoles per a la Sostenibilitat (XESC) has operated since 2009, integrating municipal and eco-school programs into a unified network. Madrid's Red de Escuelas Sostenibles de la Comunidad de Madrid (RESM) connects primary and secondary schools implementing comprehensive Eco-Action Plans, emphasizing teacher training during the initial three years of participation. Barcelona's Escuelas + Sostenibles (E+S), integrated within the broader "Barcelona + Sostenible" strategy, now involves over half of all city schools across educational levels. These networks typically require participating schools to establish eco-committees that include student and parent representatives to conduct environmental audits and develop projects addressing energy, waste management, biodiversity, mobility, and related sustainability areas.

School-city partnerships: Many municipalities implement Agenda 21 Escolar programs that facilitate student-municipality collaboration on local sustainability issues. Several cities establish joint school-town hall student councils that provide advisory input on environmental policies. The national "Pueblos Educativos" initiative, coordinated by the Ministry of Environment, pairs rural schools with community development projects. Barcelona's municipal "Camino Escolar" program creates safe, environmentally friendly routes for children to walk or cycle to school, promoting urban sustainability awareness and health education. Additional local initiatives include school gardens and tree-planting events supported by municipal environmental offices.

School lifestyle programs and competitions: Educational institutions organize campaigns focused on energy conservation and waste reduction, including "recreos residuo cero" (zero waste breaks), water-saving competitions, and school recycling initiatives. These activities often connect to national competitions such as CENEAM eco-audits. Recognition programs like "Premios Escuelas

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Sostenibles" in Barcelona and regional good-practice contests acknowledge outstanding school sustainability projects.

Non-formal youth networks: Beyond formal curricula, Spanish youth climate activism demonstrates significant strength through grassroots organizations like "Fridays for Future – Juventud por el Clima" and local youth councils that organize school-focused climate strikes and awareness campaigns. Student NGO platforms, including Greenpeace Student Chapters and European Youth Parliament Environment Committees, provide informal leadership development opportunities.

Spanish educational policy explicitly positions students as active protagonists in sustainability education. The ESenRED network, which coordinates national sustainable school networks, emphasizes that "significant changes require that students are the protagonists and teachers are the driving force".

The biennial "Conferencia Estatal de Jóvenes – Cuidemos el Planeta" (CONFINT) exemplifies this participatory approach. CONFINT operates as a comprehensive participatory process supported by MEFP and ESenRED, connecting hundreds of student delegates to share project experiences, debate action strategies, and develop local and global sustainability approaches. The conference aims to enhance youth leadership capacity through structured dialogue and cooperation, with participating student representatives subsequently engaging in local and national sustainability forums.

Within individual schools, many institutions have established eco-student councils or environmental commissions. Students organize peer-learning "micronetworks," such as Barcelona's "microrred Alimenta't amb Seny" focused on healthy sustainable eating practices, and develop digital campaigns including videos and social media initiatives. School-initiated digital innovations encompass eTwinning climate projects, student environmental podcasts, and applications for mapping school carbon footprints, though these efforts currently lack systematic institutional support.

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3. OpenPass4Climate platform & passport description

The OpenPass4Climate platform is an innovative educational tool designed to certify sustainability-related competences through an Open Badge system, aligned with the European Union's GreenComp framework. Its primary objective is to recognize and promote knowledge, skills, and attitudes essential for advancing sustainability education and careers across Europe.

The platform's badge system is organized into four GreenComp macro-areas (Figure 1):

- Embodying Sustainability Values (valuing sustainability, supporting fairness, promoting nature),
- Embracing Complexity in Sustainability (systems thinking, critical thinking, problem framing),
- Envisioning Sustainable Futures (futures literacy, adaptability, exploratory thinking),
- Acting for Sustainability (political agency, collective action, individual initiative).

Each macro-area is associated with three badges, and a Super Badge is awarded to users who successfully earn at least one badge in each macro-area, symbolizing a holistic and interdisciplinary mastery of sustainability education (Figure 2).

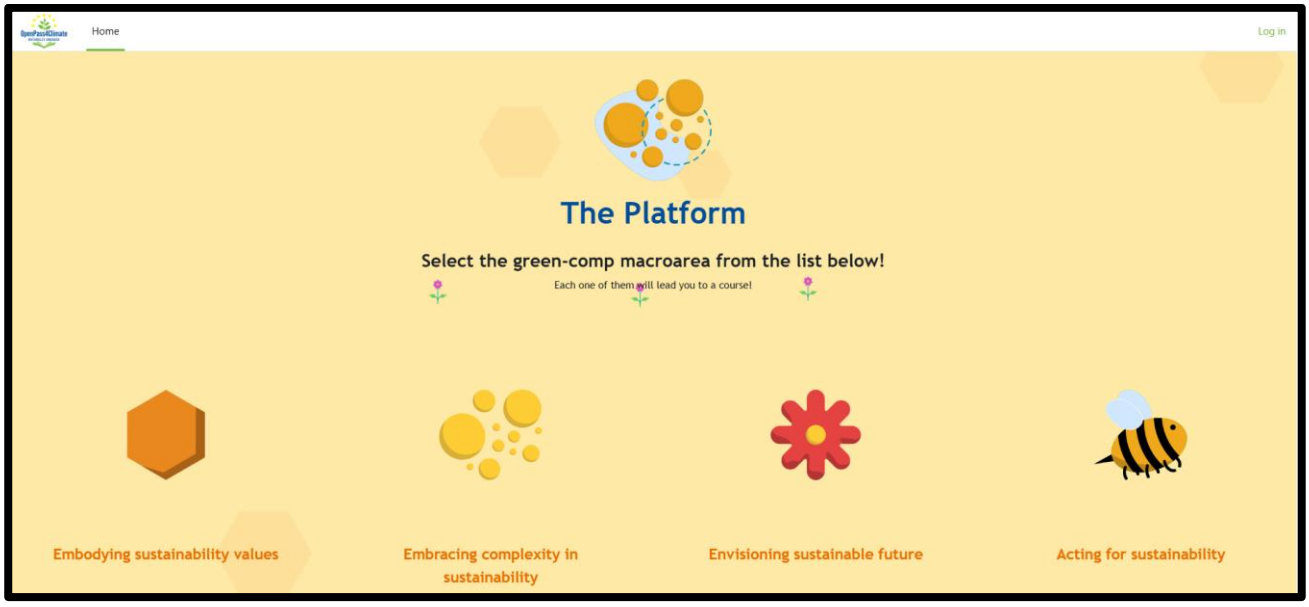

Figure 1 OpenPass4Climate platform: https://openpass4climate.csciformazione.eu/

The platform uses a dual certification process:

Human-reviewed curriculum-based system: users submit documentation of their eco-pedagogical activities, which are evaluated for relevance, competence development, and verifiability.

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Knowledge-based assessment: users complete a multiple-choice quiz related to the macro-area, developed by the University of Valladolid, requiring a minimum score to pass.

Each badge corresponds to learning outcomes verified through activities and assessments, and efforts are evaluated using the European Credit Transfer and Accumulation System (ECTS) standard. Following the ECTS standard, one badge typically corresponds to at least 25 verified learning hours, equating to one ECTS credit. A three-tiered badge structure (Bronze for 25–50 hours, Silver for 50–75 hours, and Gold for 75+ hours) allows for differentiated recognition based on the learner's level of engagement and achievement.

Figure 2 OpenPass4Climate Overview of the Open Badges

The platform emphasizes standardization, transparency, and portability, aiming to integrate sustainability competences into formal education pathways while also fostering lifelong learning.

In terms of design, each badge features a custom logo representing its GreenComp macro-area and tier. Each badge incorporates detailed metadata specifying the issuing body, the competences certified, the validation criteria, and the framework references. Furthermore, the badges are visually differentiated through a coherent design system using symbols (honeycomb, pollen, flower, and bee) corresponding to the respective macro-areas and medal colors (bronze, silver, gold). The Super Badge, distinctively marked in blue, represents the culmination of comprehensive competency acquisition.

Ultimately, OpenPass4Climate aims to offer an effective, credible, and scalable tool for promoting eco-pedagogical engagement, supporting lifelong learning, and enhancing professional employability in the emerging green economy. It can bridge formal and non-formal learning

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experiences, reinforcing the link between sustainability education and recognized European frameworks, and promoting the development of critical competencies necessary for fostering a resilient, sustainable future across educational and professional contexts.

OpenPass4Climate Passport is a platform where users can collect, manage, and share all their Climate-environment-related badges, like the ones from the OpenPass4Climate Passport, in one place. The system allows users to add newly earned badges and even those issued to different email addresses, making it easy to maintain a single, complete record of all their learning and contributions.

The platform is built with advanced technologies that protect user privacy and ensure a smooth, secure experience. It offers a simple and accessible interface where all badges and certificates are displayed clearly, making it easy to understand what each represents. Whether earned through formal education, training programmes, online courses, or community projects, every badge contributes to a broader picture of the learner's climate journey.

OpenPass4Climate Passport supports lifelong learning by allowing the user to track progress over time and present achievements in a structured and professional way. This helps learners use their badge portfolio in job applications, educational settings, or sustainability initiatives, and encourages continued engagement in meaningful climate action.

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4. Methodology in the Educational Context (Prior to Higher Education Institutions)

As part of the OpenPass4Climate initiative, specifically concerning PR6 and under the leadership of CSCI Novara, the partnership has conducted national focus groups across Italy, France, Spain, Portugal, and Belgium. These groups comprised stakeholders representing the educational sector. The goal of the focus groups was to assess the ease of use and credibility of the OpenPass4Climate platform and understand how the OpenPass4Climate system can be applied and integrated in the educational environment before HEI, with emphasis on secondary schools.

Participants were asked a series of questions, including general questions about the platform and questions specific to school representatives. Accordingly, the questions were divided into 2 sections:

General questions: Overview of the platform

1. How intuitive and user-friendly do you find the platform's navigation and interface?
2. Are the instructions for uploading and documenting an eco-pedagogical activity clear and easy to follow?
3. How effective do you think the badge system would be in motivating your students to participate in green activities?
4. Are the criteria for earning bronze, silver, or golden badges transparent and understandable?

Specific questions for education stakeholders: Implementation of OpenPass4Climate platform in schools

1. How could this platform be integrated into your existing educational programs or curricula? Please consider both formal and non-formal education activities. Provide at least 2 ways per participant.
2. What challenges or barriers do you foresee in implementing this platform within your institution?
3. What types of eco-pedagogical activities would be most feasible and relevant for your students to upload to the platform?
4. How could the open badges platform be used to recognize and validate teachers' professional development in sustainability education and eco-pedagogical competencies?
5. Would you recommend any additional functionalities to better suit the needs of educators and students?
6. What additional resources, support or training would you need to effectively implement this platform in your educational setting?

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4.1. Guidelines

To ensure the smooth and consistent organization of focus groups across all participating countries, consortium members were provided with a set of general instructions. These guidelines were designed to support the effective facilitation of the focus group sessions and to promote coherence in both the process and the data collection. By offering a common framework, the instructions aimed to help partners structure discussions, engage participants meaningfully, and gather valuable insights that are relevant to the objectives of the OpenPass4Climate project. This shared approach ensured that, despite different national contexts, all contributions could have been compared, analyzed, and integrated into a unified understanding of the educational sector's role in implementing OpenPass4Climate platform in schools.

General instructions:

- *Select suitable participants for the focus group based on the criteria we outlined earlier: their attitude and aptitude, along with their practical and theoretical knowledge regarding climate issues.*
- *Create a script with the questions translated into Italian, French, Portuguese, and Spanish (you can use https://www.deepl.com/translator for assistance).*
- *Find a comfortable and accessible venue to hold the focus group, and ensure you have the necessary equipment for recording and note-taking. You might consider using Miro as well.*
- *Conduct the session skillfully and fairly, encouraging engagement and mutual respect among all participants. Start by introducing yourself and the topic, outlining the focus group's rules and objectives as mentioned earlier. Pose questions, probe for deeper insights when needed, and wrap up by expressing gratitude and providing a debrief to the attendees.*
- *To ensure cohesive responses from the group, it's vital to allow enough time for reflection on each question. By giving attendees adequate time, they can thoughtfully consider their ideas, engage in discussions, and contribute to a comprehensive and well-considered collective response.*
- *Analyze the data collected and write a report with the findings and conclusions. Identify themes and patterns and relate them to our research questions.*
- *Share the platform link with the participants: https://openpass4climate.csciformazione.eu , explain how it works.*

4.2. Composition of participants in each focus group

Italy (CSCI Novara)

- Number: 6 + 2 facilitators

- Profile: Education stakeholders: secondary school teachers.

France (UniLaSalle)

- Number: 5 participants

- Profile: Training Director, PhD, Trainer, Associate researcher, secondary school teacher.

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Spain (UVa)

- Number: 6 participants
- Profile: Secondary education teachers, 1 primary education teacher.

Portugal (UNL)

- Number: 6 participants
- Profile: education stakeholders.

Belgium (UNICA)

- Number: 5 participants
- Profile: participants representing youth organizations and climate-related initiatives, including student unions, Erasmus+ projects connected to youth and climate, and education networks.

4.3. Summary of findings

4.3.1. Overview of the platform

The focus groups conducted across Italy, France, Spain, Portugal, and Belgium yielded a generally positive assessment of the OpenPass4Climate platform's usability, clarity, and educational potential, while also identifying several areas for improvement. Participants described the platform as intuitive, accessible, and easy to navigate, an important strength in educational settings where both students and teachers benefit from tools requiring minimal training. However, some concerns were raised, particularly in France and Belgium, regarding occasional non-linear navigation, a confusing content structure, and the inconspicuous placement of tutorials. Participants in these countries suggested enhancing the user experience by integrating support animations, reorganizing topic categories, and incorporating more engaging elements such as emojis, bringing the platform closer to the visual standards of commonly used systems like Moodle.

Although the instructions for uploading activities were generally considered clear, it was emphasized that students (especially younger or less digitally fluent users) would require initial guidance, including examples of eco-pedagogical activities to help them understand what constitutes valid evidence and how it should be documented. Linguistic accessibility was also discussed, with some identifying the use of English as a barrier, while others accepted it given the platform's European scope.

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With regard to the badge system, feedback was mixed. In Italy and Portugal, participants acknowledged its motivational potential. However, there was a shared concern that if badges are perceived as routine tasks or lack meaningful criteria, they may lose their value and fail to sustain engagement. Participants in Portugal stressed the importance of aligning badge use with clear project objectives to ensure that skill acquisition (not merely collecting badges) remains central. Spanish participants proposed awarding badges periodically to maintain student motivation and create a sustained sense of achievement, while also raising concerns about the potentially high workload required for the bronze level.

Recommendations included offering institutional support and simplifying initial badge requirements to avoid early demotivation. In France, it was suggested that badge criteria be validated by recognized educational agents and applied flexibly to support broader and more inclusive participation. Additional input from Belgium and Spain emphasized recognizing non-formal, extracurricular, or self-initiated activities to value individual commitment beyond institutional structures, especially for new teachers or student-led environmental actions. Participants also proposed alternative and more symbolic recognition models, such as visual metaphors (e.g., a flower gaining petals with each completed activity), to shift the focus from competition to personal growth.

Overall, participants across countries highlighted the need for a more student-centered design, greater pedagogical integration, and strong institutional backing to preserve the educational integrity of the platform and avoid reducing participation to a purely certifying logic focused on hours rather than meaningful outcomes.

4.3.2. Implementation of OpenPass4Climate platform in schools

Participants across the five national focus groups identified multiple opportunities and challenges related to the implementation of the OpenPass4Climate platform in school settings. There was strong agreement that the platform and its badge system could be effectively integrated into a variety of curricular and extracurricular contexts.

According to Italian participants, the OpenPass4Climate platform can be integrated into various areas of the national education system, particularly within school guidance activities, Civic Education, PCTO (*Percorsi per le Competenze Trasversali e per l'Orientamento*) pathways, and the school credit system. Each of these areas offers structured and meaningful opportunities to align the platform with existing educational practices and national priorities:

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School guidance is an ongoing educational process that helps students make informed choices about education and career paths. The OpenPass4Climate platform could complement this process by adding recognized, sustainability-focused achievements to students' electronic portfolios, such as those on the Ministry of Education's UNICA platform.

Civic Education, another key area for integration, is a cross-disciplinary subject introduced as a mandatory component in all Italian schools. It promotes democratic values, legal literacy, sustainability, and digital responsibility. Implementation practices vary across schools, allowing flexibility and adaptation to local contexts. Schools adopt diverse pedagogical strategies and projects to engage students in civic learning, often supported by digital platforms. In this regard, OpenPass4Climate could function as a complementary tool, similar to existing platforms like Aula01, which offers interactive civic education modules on sustainability, legality, and European citizenship, along with Open Badge certification to validate learning outcomes.

PCTO pathways (Percorsi per le Competenze Trasversali e l'Orientamento), mandatory for all upper secondary students, aim to develop soft skills and prepare for careers through practical experiences, often in collaboration with external partners. OpenPass4Climate could play a significant role by enabling students to document and reflect on climate-related learning and experiences in a formalized, credentialed format, thus highlighting the competencies they acquire.

The **school credit system** in the final three years of upper secondary school, which contributes to the final grade of the Esame di Stato, includes participation in extracurricular, civic, and personal development activities. Badges awarded through OpenPass4Climate could provide tangible evidence of such engagement, supporting a more comprehensive and holistic evaluation of each student's learning path.

In accordance with Spanish stakeholders, the platform can be incorporated into a variety of formal and non-formal educational contexts:

In formal contexts, integration has been highlighted within Natural Sciences and Arts curricula, as evaluable activities in environmental studies and as part of existing "environmental seal" initiatives in secondary education. The Educational Attention Measures (MAE) subject, which includes one hour per week, has been particularly noted as ideal, since it emphasises the development of skills through meaningful projects and collaborative problem-solving, without focusing on standard curriculum content. Other relevant subjects include Geology, Biology, and Geography.

In non-formal contexts, integration is possible through classroom projects, commemorative events, e-twinning initiatives and the evaluation of extracurricular activities such as visits to museums,

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exhibitions, excursions, maintenance of ecological gardens and special environmental days and workshops.

As per the Portuguese perspective, the adoption of the platform would be seamless for schools and increase value. This would happen through the implementation of projects throughout the year, allowing students to create their own pathways by contributing to the development of thematic and school projects. The platform could integrate teacher evaluations and foster community engagement. The development of projects outside the classroom is perceived as highly beneficial and engaging for students. In addition, rewarding students with badges is seen as motivating and beneficial, as it can help them discover interests in subjects and topics they were previously unaware of. Recognizing students who participate in eco-pedagogical activities further adds to the benefits.

In line with the French perspective, badges should align with existing assessment frameworks or serve as complementary recognition tools for student initiatives. It is fundamental to position badges as a tool to support sustainability strategies, rather than as a mandatory requirement. Examples mentioned include potential integration into modules via climate murals or ecological diagnostics.

Finally, according to the Belgian participants, the platform could be incorporated into extracurricular activities such as environmental clubs, student unions and volunteer projects. They noted that badges could complement students' CVs and applications for higher education, pointing out that engagement with the platform could become part of alumni networks, allowing students to demonstrate an ongoing commitment to climate action even after graduation.

However, during the national focus groups several implementation challenges were raised. According to Italian and Spanish participants, the primary challenge is time management. Stakeholders expressed that integrating the platform necessitates careful institutional planning and a clear allocation of time within the school schedule. They also emphasized students' existing workload and the potential difficulty in motivating them to engage meaningfully with the platform. Other issues concern staff engagement (potential lack of interest from some teachers, need for teacher coordinators for communication, and importance of management team support), and resource limitations were identified, particularly in primary education where technological resources are more limited. Spanish stakeholders suggested considering two implementation approaches: center-wide (with management support) and individual teacher-led initiatives.

Regarding the Portuguese perspective, there is a large offer of projects and platforms that schools can join; it is necessary to choose what best suits each school's reality and strategic goals. The involvement of school leadership and teachers is fundamental; if it's not strategic for schools, it will hardly have an impact. They highlighted a lack of a culture where students autonomously promote

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these types of activities in schools, which remains a teacher's role. It was mentioned that it is also important to ensure the sustainability of the project so that it is not a one-time activity.

From the French perspective, several barriers were identified:

- Organizational: time constraints and heavy workloads.
- Institutional: alignment with the institution’s overall strategy.
- Philosophical: tension between formal education and activism.

According to Belgian participants, barriers include digital inequality, given that not all students have equal access to devices or internet connections. GDPR compliance and the requirement for parental consent for underage students were highlighted as legal and administrative challenges. Participants warned that if the platform required students to upload large multimedia files (videos, heavy images), dissatisfaction and access barriers would increase. They therefore advocated for text-based or small file uploads to keep participation accessible and equitable.

On the topic of teacher professional development, the platform was valued as a tool to certify engagement in training and educational projects, particularly beneficial for early-career teachers or those seeking mobility. Making badges visible on platforms like LinkedIn and aligning them with national professional frameworks was strongly recommended, with Belgium and Portugal proposing a dual internal and external validation process to enhance credibility. To support implementation, Spanish participants recommended platform improvements such as including clear examples of activities, multimedia guides, editable rubrics, self-assessment tools, and tutor support. They also proposed integration with broader European frameworks like EPALE. France further suggested incorporating AI-based validation tools, while Belgium warned against excessive bureaucracy and self-promotion that might obscure educational aims.

Across all countries, the need for structured teacher training and continuous technical support was emphasized. Suggestions included introductory sessions with expert tutors, cascade training led by department heads, work with small pilot groups, and the establishment of support centers and teacher working groups.

Lastly, participants agreed on the importance of an official, institutionally endorsed rollout supported by exclusive use of school accounts to ensure data security, transparency, and institutional trust, thereby increasing the likelihood of successful and sustainable adoption.

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5. Conclusion

The implementation of the OpenPass4Climate platform in schools presents a valuable opportunity to enrich educational practices through the recognition of climate-related learning and civic engagement. The methodological insights gathered from national focus groups highlight both the flexibility and the adaptability of the platform across diverse educational systems and subject areas, including Civic Education, PCTO pathways, non-formal learning, and school guidance frameworks. Across the focus groups, participants consistently highlighted the platform's intuitive design, its alignment with civic and sustainability education, and its potential to support both student engagement and teacher professional development. Successful integration requires a structured yet context-sensitive approach, supported by clear pedagogical objectives, alignment with existing institutional strategies, and sustained involvement from educators and leadership teams. Ensuring compatibility with existing national platforms and compliance with data protection standards (particularly in relation to minors) is essential for building institutional trust and long-term sustainability. As both a pedagogical tool and a recognition system, OpenPass4Climate platform and passport tandem has the potential to transform how schools engage students in climate education, support interdisciplinary learning, and promote active citizenship through a coherent, scalable, and learner-centered methodology.

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