



EUROPEAN POLICY BRIEF



FINAL POLICY BRIEF

OTTER (Outdoor Science Education for a Sustainable Future) is delivering its final policy brief with recommendations drawn through 30 months of the project.

29.02.2024

INTRODUCTION

Much analysis has been carried out on the importance of science education both in schools and in higher education. However, science education outside the classroom, which refers to informal science education, and the science education effects of non-educational activities, are not well explored in terms of their nature and effects. Acquiring knowledge, and in particular, evaluating knowledge, often with the help of the Internet, is happening in reality frequently, and should be recognised for what it contributes in terms of more sophisticated consumers and scientific citizenship. Consideration of what is available and what is being learnt would be useful to understand how science education outside the classroom influences today's citizens.

In the short term, the proposed action should identify good practices outside the classroom. It should consider what impact this information might have on formal and informal science education for students and citizens. In the medium term, the results of the present action will help the EU to better understand the effects of science education outside the regular education institutions and will increase the range of innovative products in science education that reflect societal needs. In the long term the results of the research should contribute to considerations on accrediting the available information.

Inspiring young people to study science remains a challenge. In today's schools, STEAM subjects are still perceived as challenging. The traditional and theoretical approaches to teaching are not always designed to be engaging. On the other hand, the non-formal character of EOC tends to generate scepticism among various actors in education. While there is evidence that this form of education can contribute to an array of positive cognitive, affective, and psychomotor outcomes facilitating scientific literacy, the fact remains that most European educational systems do not embrace EOC in their official curricula, but instead narrow its use to the voluntary discretion of educators. Combined with a lack of an outdoor learning culture in many countries, as well as the disproportional focus and orientation towards educational results and testing, this vital educational approach for developing skills and knowledge remains vastly underused.

Through an extensive literature review (D2.1), a mapping study of accreditation approaches in Europe (D5.1), a set of pilot activities in four countries (Spain, Ireland, Finland and Hungary – D3.5) and the detailed analyses

of students' and teachers' perspectives post-pilot implementation (D4.4), the OTTER project has compiled numerous conclusions and steps that should be taken into consideration on a policy level. Additionally, the final conference organised for stakeholders, including sister projects, resulted in valuable perspectives also included in these recommendations. Finally, guidelines for accreditation (D5.5) provide possible solutions that policymakers, along with other stakeholders (teachers, schools, HEIs, NGOs, researchers, etc.) can explore on the path towards accreditation of EOC. The following recommendations constitute the combined effort of all the abovementioned activities and deliverables.

EVIDENCE AND ANALYSIS

Final policy recommendations in this document rely on evidence-based research, as well as consultations with various stakeholders through the project Hub and final conference. OTTER activities that encompassed, among others, European and international scientific literature and grey material review, mapping of successful EOC practices and accreditation approaches, along with in-depth research conducted within the pilots, led to: 1) emphasising the positive effects EOC has on the uptake of scientific knowledge and 21st century skills with students; 2) providing evidence that teachers benefited professionally from engaging in the OTTER project (and subsequently EOC approach); 3) demonstrating shared challenges of integrating EOC in formal education as numerous obstacles proved to be widespread, such as time restrictions of teachers, lack of knowledge and negative attitudes of parents, teachers and policy makers, as well as rigid curriculum demands along with assessment obligations.

Our recommendations align with the European Education Area goals, and they affirm a holistic approach to education and training and emphasise the role of all kinds of education and learning. We argue that while EOC is usually observed as a complementary approach and a form of learning that is left up to the capacities and inspiration of the educator, it should instead be embedded in the curricula, teacher professional learning opportunities and other innovative approaches for engaging student participation in STEAM subjects. In other words, a wider effort of various stakeholders is necessary if EOC is to be embedded correctly and widely throughout Europe, especially considering the variety of educational systems that must be taken into consideration.

POLICY IMPLICATIONS AND RECOMMENDATIONS

- **Education Outside the Classroom is effective for students' knowledge and skills uptake and requires a system to support planning and preparation, alignment with curriculum objectives, pre and post learning, visit to a site, evidence-based action, continuous reflection and assessment**

Based on its pilots, OTTER proved a set of cognitive, affective, social and behavioural benefits of education outside the classroom and the direct effects on skills, scientific knowledge, as well as the motivation of both teachers and students (see D4.4). Namely, EOC enhanced *student learning, ability to collaborate and build relationships, increased agency in the wider school environment, connections to the local community and environment, and aspirations for scientific careers*. However, for EOC to accomplish these outcomes, a system is needed to support all the elements of preparation and assessment. This requires EOC to be included in teacher education (HEIs), embedded in the curriculum (national policy makers) and supported by the schools.

- **Teachers benefit professionally from engaging in EOC activities and should be regarded as equal stakeholders and have ownership in the process**

A common theme that emerged from the findings was the teachers' acknowledgement that they themselves benefitted professionally from engaging in the OTTER project. Teachers felt that their own professional

learning was enhanced as a result of engaging with the EOC approach to teaching and the facilitators providing advice on the OTTER methodology. Recognition of EOC as an innovative pedagogical approach as part of professional learning would pave the way to greater enactment of the methodology and deep learning experiences gained from the many benefits of EOC. In addition, teachers have felt respected and motivated in the entire process. The feedback was that having the ownership of the process and having a flexible approach that can be adapted to the local context was important for the teachers. The OTTER Lab offers teachers a flexible approach with pedagogical underpinnings to build a well-thought educational EOC activity to suit different classes and curricula.

- **Successful EOC implementation will require both top-down and bottom-up approaches**

For EOC to be perceived as an intrinsic part of formal education, it is necessary to engage stakeholders on several levels:

- Policy makers need to recognize EOC as a complementary part of the formal curriculum and work on the transformation of the assessment systems which are currently focused solely on rankings;
- Policy makers should also support the legislative recognition of micro credentials issued by Higher Education Institutions and other education providers, particularly in the realm of Education Outside the Classroom. This is especially relevant for teacher training, where the diverse entry points and degrees allow for a modular structure and need flexibility at the same time;
- HEIs focused on teacher training should provide adequate courses through curricula and/or through short courses resulting in microcredentials;
- Schools should provide a supportive environment for the teachers who engage in EOC and provide tools and resources needed for such activities;
- Teachers should actively engage with the process of embedding EOC in the curriculum and voice obstacles, concerns, as well as benefits of the implementation to relevant decision makers;
- NGOs, Youth centers, Museums, Associations and broader communities should work on promoting the benefits of this type of learning. As this approach is not standard in most educational systems, it can be observed as ineffective or even unsafe. Informational campaigns should be conducted to ensure that the benefits of EOC and good practices are known and understood by parents and broader communities;
- Students need to be engaged and considered as stakeholders in the process. One of the novelties of OTTER Lab is the youth initiative, which aims to develop students' active participation and citizenship skills. Findings from the student data reveal that students' active participation in science-related projects, their creative approach to presenting information, and their expressions of joy and satisfaction in outdoor learning experiences all contribute to a positive environment that fosters an interest in science.

- **Gender equity, inclusion and diversity needs to be taken into consideration for students studying STEAM subjects**

It is important to ensure equity, inclusion and diversity, especially when we are talking about STEAM. Analysis of the literature revealed that the majority of the research did not control or assess for effects of gender or geographical difference. The recommendation of this project would be to fully explore these differences in perceptions, motivation and educational approaches and assess the potential solutions and methodologies to promote inclusion and diversity. To promote inclusion in education, equal opportunities should be given to all genders and also to reduce inequalities between countries, between rural and urban areas or between students belonging to different socio-economic backgrounds (<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0625&from=FR>).

SUSTAINABILITY AND LEGACY

The OTTER [Learning Platform](#) and [Toolkit](#) are the main results of the project and present a set of interactive and comprehensive tools to understand the OTTER Lab Approach, formulate EOC activities and gain knowledge on sustainability. OTTER also produced an interactive [Map](#) created to support educators and practitioners in identifying EOC sites that range from science museums and centres to farms and botanical gardens. It is also possible to contribute to the Map and expand the list with more sites and countries.

RESEARCH PARAMETERS

The overall objective of the OTTER project was to enhance the understanding of EOC practices and pedagogies and how they can help improve the acquisition of scientific knowledge and transferable skills in students, specifically in the field of environmental sustainability and the reduction of plastic waste. It aimed to increase interest in scientific topics among young people, while also contributing to the range of innovative educational projects and the increase of scientific citizenship and proficiency within the EU.

OTTER connected experts mainly from four different regions within the continent (Finland, Hungary, Ireland and Spain) but also from other participating countries (France, Cyprus, and the Netherlands) to collaborate and discuss ideas related to EOC. The conclusions of these discussions, along with the set of materials developed within the consortium, provided a basis to carry out a programme of EOC pilot schemes and analyse the effects they have on the performance of participating students. Investigating students' 21st Century Skills, scientific knowledge of the Sustainable Development Goals (especially SDG 4) and awareness of appropriate behaviour related to inclusion and diversity provided an insight into the benefits and challenges associated with EOC and its complementarity/compatibility with formal education.

Pilot completion was followed by the analysis that highlighted complementary approaches in students' performance across different geographical locations and gender differences. Comparisons were drawn between those students who participated in the pilot schemes and those who were taught through formal educational methods only. The project further aimed to identify methods for measuring, assessing and accrediting the knowledge and skills developed via education outside the classroom and worked to enrich the inventory of tools available for future methods of accreditation beyond the end of the project. On the horizon 2025, it was stated by the European Union that: *"non-formal learning, including volunteering helps gain life and professional skills and competences. These skills and competences need to be fostered, valued, and recognised in full"*. Thus, OTTER goal is to contribute in a unique manner to address the place of outside the classroom learning activities and their assessment in our schools and societies.

PROJECT IDENTITY

PROJECT NAME	Outdoor Science Education for a Sustainable Future (OTTER)
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CONSORTIUM	Cardet Centre For The Advancement Of Research & Development – CARDET – Lefkosia, Cyprus

Fondation Européenne de la Science – European Science Foundation – ESF –
Strasbourg, France

Learning Scoop - Oppimisen Osuuskunta – LS –
Kangasala, Finland

Rijksuniversiteit Groningen – RUG –
Groningen, Netherlands

The Big Van Theory – TBVT –
Castellbisbal, Spain

University of Limerick – UL –
Limerick, Ireland

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DURATION

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BUDGET

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WEBSITE

<https://otter-project.eu/>

FOR MORE INFORMATION

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FURTHER READING

D2.1 Literature review and compendium of successful practices
D4.4 Report on integrated analysis of process and outcome data across all
participating countries, including a comparison of student performance across
gender and geographical location variables
D5.1 Mapping study of accreditation approaches in Europe
D5.3 Final OTTER Toolkit – adapted final version
D5.5 Guidelines for accreditation



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