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# Policy brief for Teachers on the COSMOS Approach

Open schooling approach to science education



**COSMOS** (Creating Organizational Structures for Meaningful Science education through Open Schooling for all) / [cosmosproject.eu](https://cosmosproject.eu)

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## Introduction to the Policy Briefs on the COSMOS Approach

This document compiles a series of policy briefs developed as part of the COSMOS project, an EU-funded initiative under the Horizon 2020 Research and Innovation programme. Each policy brief is designed to address the unique needs and perspectives of key stakeholders – **teachers, school leaders, policymakers, and the European Commission**. The goal of these briefs is to provide clear, evidence-based recommendations that promote the adoption of the COSMOS open schooling approach across various educational and policy contexts.

The development of these policy briefs was guided by a structured framework (D2.1 COSMOS Framework; Sarid, et al. 2024<sup>1</sup>) that emphasized conciseness, actionable insights, and alignment with the COSMOS project's objectives. The guidelines ensured each brief focuses on the essential components of COSMOS: Core Organisational Structure for Promoting Open Schooling (CORPOS), Communities of Practice (CoP), Socio-Scientific Inquiry-Based Learning (SSIBL), and Teacher Professional Development (TPD). Together, these elements form a cohesive model that fosters educational innovation, community engagement, and critical socio-scientific inquiry within schools.

To create these briefs, we drew on the insights and recommendations from the COSMOS open schooling roadmaps (D6.2 Open Schooling Roadmaps), as well as implementations and lessons learned from this work at the primary (D3.1/D3.2) and secondary school level (D4.1/D4.2), case studies from schools implementing COSMOS across Europe (D6.1 Report on case studies, developed by partners, centred on particularly interesting SSIBL-CoP implementations in their countries during Round 1 and 2), and extensive research during the entire process (D7.1 Final Evaluation of COSMOS). Each brief highlights the specific benefits, expected outcomes, and tailored policy recommendations suited to its target audience. This document provides a comprehensive resource to guide educational stakeholders in understanding, implementing, and sustaining the COSMOS approach to science education reform, enhancing both student learning and community collaboration.

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<sup>1</sup> A. Sarid, J. Boeve-de Pauw, A. Christodoulou, M. Doms, N. Gericke, D. Goldman, P. Reis, A. Veldkamp, S. Walan & M. C. P. J. Knippels (2024). Reconceptualizing open schooling: towards a multidimensional model of school openness. *Journal of Curriculum Studies*, 1–19. <https://doi.org/10.1080/00220272.2024.2392592>



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## **COSMOS in a Brief for Teachers: Empowering Teachers for Open Schooling Transformation through Science Education**

### **Executive Summary**

The COSMOS project, supported by the EU's Horizon 2020 programme, introduces an open schooling approach that brings community-focused, inquiry-based learning into science education. This policy brief provides teachers with a guide to the COSMOS framework, highlighting its essential components: CORPOS (Core Organisational Structure for Promoting Open Schooling), Communities of Practice (CoP), Socio-Scientific Inquiry-Based Learning (SSIBL), and Teacher Professional Development (TPD). By integrating SSIBL and community partnerships into the classroom, teachers can inspire student engagement, foster critical thinking, develop action competence, and promote active citizenship. COSMOS equips teachers to connect science education with real-world socio-scientific issues, enabling students to address local and global challenges with curiosity, responsibility, and purpose. This brief also



offers practical recommendations to support teachers in implementing COSMOS effectively, including fostering partnerships, adopting flexible teaching methods, and engaging in ongoing professional development.

## Background and Context

Contemporary education increasingly calls for learning experiences that go beyond traditional classroom boundaries, bridging school with community and real-life issues. COSMOS addresses this demand by equipping teachers to foster inquiry-based learning aligned with local and global challenges like environmental sustainability, public health, and civic responsibility. The COSMOS approach helps teachers empower students as active citizens who understand and address socio-scientific issues through practical, community-centred education. With the support of open schooling frameworks, COSMOS cultivates a learning environment that emphasizes collaborative inquiry, ethical reasoning, and critical thinking.

## Key Components of the COSMOS Approach

1. **Core Organisational Structure for Promoting Open Schooling (CORPOS) or Open Schooling Team:** is a collaborative, school-based team that fosters an open schooling culture within the school environment. Composed of teachers, school staff, and community stakeholders, CORPOS supports the planning, implementation, and sustainability of COSMOS initiatives. For teachers, CORPOS serves as a structural backbone, facilitating access to community resources and interdisciplinary support, thus creating a consistent framework for engaging students in socio-scientific issues.
2. **Community of Practice (CoP):** connects teachers with a broader network of community experts, including scientists, local business owners, health professionals, and civic leaders. This community collaboration enhances the relevance and impact of COSMOS-based learning activities by bringing real-world expertise and resources into the classroom. Through the CoP, teachers can develop dynamic, project-based learning opportunities that address authentic local and global challenges, fostering a sense of student agency and responsibility.
3. **Socio-Scientific Inquiry-Based Learning (SSIBL):** is at the core of COSMOS, equipping teachers with a structured approach for integrating scientific inquiry with social relevance. Through the stages of “Ask, Find Out, Act”, SSIBL guides students in researching and addressing real-world problems, fostering skills in critical thinking, problem-solving, and ethical decision-making. Teachers using SSIBL frameworks can transform science education into an interactive, impactful experience that helps students connect theoretical knowledge with practical solutions to community issues.
4. **Teacher Professional Development (TPD):** Recognizing the role of teachers as facilitators of COSMOS initiatives, the project offers resources that provide ongoing support in integrating SSIBL and CoP models into teaching. TPD activities focus on enhancing teachers’ competencies in inquiry-based learning, open schooling

collaboration, and reflective teaching practices, ensuring they are equipped to lead innovative, community-driven science education.

## Outcomes and Benefits

1. **Enhanced Student Engagement:** COSMOS encourages active student participation in learning that is relevant to their lives. Through inquiry-driven projects, students engage deeply with topics such as environmental conservation, health awareness, and sustainable practices, making learning more meaningful and enjoyable.
2. **Development of Critical Thinking and Problem-Solving Skills:** By exploring complex socio-scientific issues, students learn to analyse information, evaluate perspectives, and propose solutions. The SSIBL framework strengthens their ability to think critically and make informed, ethical decisions—a skill set essential for active, responsible citizenship.
3. **Enhanced action competence towards sustainability:** COSMOS approach develops students' knowledge about their own possibilities to contribute to a more sustainable future through individual and collective action, boost their self confidence in their capacity to create an impact regarding SSIs, and ultimately to feel empowered and driven to engage in action taking.
4. **Strengthened Community Connections:** COSMOS promotes partnerships with local experts and stakeholders, transforming learning into a collaborative effort between schools and communities. Teachers play a central role in building these connections, fostering mutual support that enhances educational outcomes and community cohesion.
5. **Continuous Teacher Professional Growth:** The COSMOS approach encourages teachers to engage in reflective and collaborative practices, enhancing their teaching strategies and understanding of community-centred education. By participating in TPD, teachers gain confidence and skills that help them implement open schooling models effectively, thereby enriching their professional development.

## Policy Recommendations for Effective COSMOS Implementation

1. **Establish Local Partnerships:** Teachers are encouraged to collaborate with community organizations, such as local government bodies, charities, environmental agencies, healthcare providers, and NGOs. Building relationships with these partners enhances the authenticity and relevance of SSIBL projects, providing students with diverse perspectives and real-world applications of scientific knowledge.
2. **Integrate SSIBL into the Curriculum:** Teachers should incorporate SSIBL activities that allow students to investigate and address real-life issues within their local contexts. This integration promotes active, hands-on learning experiences that bridge classroom science with community needs, empowering students to contribute meaningfully to their surroundings.

3. **Support for Flexible Teaching Methods:** Schools should enable teachers to adopt inquiry-based and project-based teaching methods, which foster critical engagement with socio-scientific issues. This flexibility allows teachers to tailor their approaches based on students' interests and community challenges, ensuring that learning is both engaging and relevant.
4. **Commit to Teacher Professional Development (TPD):** Effective implementation of COSMOS relies on ongoing professional support for teachers. Schools should provide TPD opportunities focused on SSIBL, CoP engagement, and reflective teaching practices, enabling teachers to sustain COSMOS activities and adapt to evolving community contexts.

## Challenges and Solutions for Teachers

1. **Limited Resources and Time Constraints:** COSMOS-based initiatives require time and resources that may be difficult to accommodate within existing school schedules and budgets. Teachers can mitigate these challenges by forming partnerships with local organizations that provide financial or material support, using digital tools to facilitate CoP meetings, or starting with smaller projects that can be expanded over time.
2. **Resistance to Change in Teaching Methods:** Some teachers and administrators may be hesitant to adopt new approaches like SSIBL and CoP models due to unfamiliarity or perceived difficulty. Schools can address this challenge by offering workshops and TPD sessions that introduce COSMOS concepts and showcase their benefits, building understanding and support for innovative teaching practices.
3. **Equity and Inclusion:** To ensure all students benefit from COSMOS, teachers must be mindful of diverse student needs and contexts. This may involve adapting SSIBL projects to address issues relevant to different cultural or socioeconomic backgrounds, ensuring inclusivity in both project design and execution.
4. **Balancing Curriculum Requirements with Open Schooling Activities:** While COSMOS emphasizes flexibility, teachers may face challenges in balancing curriculum demands with open schooling projects. A possible solution is to align SSIBL activities with curricular goals, thereby integrating socio-scientific inquiry within the curriculum rather than treating it as an extra activity.



## Glossary

Alma Löv	Museum of Unexp. Art
BBC	Beit Berl College
COSMOS	Creating Organisational Structures for Meaningful science education through Open Schooling for all
CORPOS	Core ORganisational Structure for Promoting Open Schooling
CoP	Community of Practice
HEI	Higher Education Institution
IE-UL	Instituto de Educação da Universidade de Lisboa
KdG	Karel De Grote Hogeschool katholieke hogeschool
KU	Karlstad University
MoE	Ministry of Education
SDG	Sustainable Development Goals
SSI	Socio-Scientific Issue
SSIBL	Socio-Scientific Inquiry-Based Learning
SOTON	University of Southampton
STEM	Science Technology Engineering Mathematics
TPD	Teacher Professional Development
UU	Utrecht University
WP	Work Package
WSC	Winchester Science Centre

## Project partners



Utrecht University, Freudenthal Institute (Project Coordinator)  
The Netherlands



University of Southampton  
England



Karel de Grote University of Applied Sciences and Arts, Centre of Expertise in Urban Education, Belgium



Karlstads University, Research Centre SMEER (Science, Mathematics, Engineering Education Research), Sweden



University of Lisbon, Institute for Education, Portugal



Beit Berl College, Faculty of Education, Israel



Euroface Consulting, Czech Republic



Universiteits Museum Utrecht



Winchester Science Centre & Planetarium



Winchester Science Centre (WSC), England



Alma Löv Museum, Sweden



Ciência Viva, National Agency for Scientific and Technological Culture, Portugal



Ministry of Education, Department for Research and Development, Experiments and Initiatives