EUROPEAN
POLICYBRIEF

Scaling STE(A)M Open Schooling in Europe: Policy Lessons from SLE Pilots

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INTRODUCTION AND POLICY CONTEXT

Open Schooling, STE(A)M, and the future of learning in Europe

In the context of the green and digital transitions, the European Union is placing renewed emphasis on transforming education systems to meet future societal and economic challenges. Central to this transformation is the promotion of **open, inclusive, and innovation-driven learning environments**, where **STE(A)M education** (Science, Technology, Engineering, Arts and All subjects, and Mathematics) plays a vital role in shaping a resilient, cohesive, and forward-looking Europe.

Strategic Priorities of the European Commission

The **Union of Skills**, one of the flagship EC priorities of the **2024–2029 Political Guidelines**, calls for a stronger alignment between education and labour market needs. This includes fostering interdisciplinary competences, strengthening basic and digital skills along lifelong learning, and promoting gender and social inclusion in technical and scientific fields.

The following EU strategies and initiatives provide a clear mandate for initiatives such as Open Schooling and STE(A)M-based learning:

- **European Education Area (EEA)**: Aims to create a unified, high-quality, and inclusive education space by 2025, prioritising teacher development, equity, and innovation through stronger cooperation across Member States and educational sectors.
- **STEM Education Strategic Plan 2024–2029**: Defines STEM and STE(A)M competences as key to Europe's competitiveness, democratic engagement, and sustainability leadership. It calls for the use of real-life challenges, cross-sector partnerships, and learner-centred pedagogies to increase engagement and diversity in scientific careers.

"Equipping all learners, regardless of gender, background or age, with STEM competences is not only essential for employment, but also for understanding complex global challenges such as climate change, digitalisation and public health."
— European Commission, STEM Education Strategic Plan 2024–2029.

- **Action Plan on Improving Basic Skills (2025)**: Launched under the mandate of EVP Ligia Deca Minzatu, this initiative responds to the persistent challenge of low proficiency in literacy, numeracy, and digital skills. It reinforces the need for project-based learning and accessible, inclusive approaches for all learners.

- **Digital Education Action Plan (2021–2027)**: Emphasises digital readiness for teachers, the use of open digital tools, and the value of networks, such as open schooling communities, in delivering equity-driven innovation in education.
- **Draghi Report on EU Competitiveness (2024)**: Urges systemic investment in talent, digital capacity, and innovation ecosystems, positioning education and training as strategic enablers of Europe's technological sovereignty and industrial resilience.

EU and International Frameworks

To further ground the open schooling and STE(A)M approach within EU and global policy frameworks, several complementary EU and international references are relevant:

- **Council Recommendation on Key Competences for Lifelong Learning (2018)**: This landmark document sets out eight key competences, including citizenship, cultural awareness, digital and STEM competences. It encourages interdisciplinary, experiential learning, supporting exactly the kind of project-based, inclusive methods used in open schooling.
- **European Sustainability Competence Framework (GreenComp)**: Developed by the JRC, GreenComp promotes a shared understanding of sustainability learning outcomes. It underlines the importance of values, systems thinking, and collaborative problem solving—integral to the scenarios developed through the pilots.
- **Joint Research Centre (JRC) Brief on STEM and STEAM Education (2024)**: Highlights the transformative potential of STE(A)M approaches in developing both scientific literacy and social engagement, especially through the integration of the arts, ethics, and creativity into science education.

"STEAM education can bridge the gap between individual learners' interests and collective societal goals, reinforcing the civic role of science education in Europe."
— JRC Brief on STEM and STEAM Education (2024)

- **STEM Competences in the EU** (JRC138618, 2024): Stresses that transversal competences—such as critical thinking, teamwork, and sustainability awareness—are as important as technical skills in preparing Europe's youth for the green and digital transitions.
- **New European Innovation Agenda (2022)**: Advocates for regional innovation ecosystems that are rooted in strong connections between education, research, and civil society—exactly the role that open schooling seeks to fulfil.

STE(A)M Learning Ecologies (SLEs) Project

The STE(A)M Learning Ecologies (SLEs) project (G.A. 101094648) is a three-year Horizon Europe initiative (2023–2025) that puts science and STE(A)M education as drivers for community engagement and educational innovation. The project supports the development of STE(A)M Learning Ecologies, open schooling partnerships between formal, non-formal and informal education providers, civil society and enterprises who are working together on real-life problem-solving situations within local communities, co-creating real-life, meaningful learning experiences for students.

At the heart of the SLEs approach is the concept of co-creation, the active involvement of diverse stakeholders in every stage of the educational process: from identifying relevant community challenges, to designing and implementing interdisciplinary learning scenarios, and finally co-assessing outcomes. This collaborative approach not only fosters more relevant and inclusive learning but also strengthens the resilience and adaptability of local education ecosystems.

What makes SLEs unique

Unlike conventional one-off initiatives, the SLEs project established living labs for STE(A)M education, grounded in iterative cycles of co-design, testing, reflection, and adaptation. These cycles ensured that educational activities remain responsive to both learners' needs and community priorities. Schools are positioned not as isolated institutions but as collaborative hubs embedded in their local environment and acting as catalysts for civic, digital, and sustainable innovation.

The project brings together three complementary dimensions:

- **Open Schooling**, to embed schools in their communities and facilitate access to knowledge.
- **Living Labs**, to emphasise stakeholder co-creation and real-world experimentation.
- **STE(A)M Education**, to promote interdisciplinary, creativity-driven learning pathways that equip learners with competences needed for innovation and sustainability such as in the green and digital transitions.

Read more about the objectives and development of SLEs in the SLEs Methodology[1].

Strategic alignment

The SLEs project contributes directly to the EU's vision for inclusive, innovative education systems and aligns with several major EU strategies and frameworks:

EU Policy/Strategy	How It Connects to the SLEs Project
STEM Education Strategic Plan	Development of real-life interdisciplinary STE(A)M scenarios
Action Plan on Basic Skills	Reinforcement of literacy, numeracy through real-life applications
GreenComp	Engagement with green sustainability awareness (e.g. biodiversity, food waste and eco-literacy)
Digital Education Action Plan	Student learning artefacts including digital storytelling and student-made campaigns
Key Competences for Lifelong Learning	Focus on citizenship, cultural awareness, creativity, collaboration, ethical and sustainability mindset

OBJECTIVES AND METHODOLOGY

SLEs Implementation 2024-2025

Following Methodology, each of the 109 SLEs identified and addressed local problems through their project, covering a wide range of topics rooted in each country's unique context. SLEs fostered collaboration between a wide variety of open schooling actors, paving the way for the establishment of local networks promoting science at local level. A map with the key topics and the types of stakeholders involved is available at https://www.steamecologies.eu/#Map and in Figure 1.

All pilot stakeholders engaged in co-creation to develop hands-on, science-based learning experiences, and providing resources and expertise for their implementation,(such as delivering class seminars on specific topics such as robotics, supporting student group work in their laboratories, guiding them in the use of new technologies such as AI, 3D printing or robots).Supported by stakeholders, learners shared their work with the community, amplifying the impact of the lessons matured through the project to a wider audience. With this new expertise and learning resources learners explored diverse **STE(A)M careers**, used real-world tools and practices, bridging the gap between schools and the working world.

Teachers also benefited, expanding their pedagogical approaches and growing professionally through collaboration with industry and university.

However, the most notable result of schools' extensive cooperation with stakeholders, is that **it paved the way to future synergies**, cultivating a collaborative culture by establishing local, national and EU-level networks, where emerging problems in the community can be addressed collectively.

Inclusion was another central outcome of this approach: marginalised learners gained opportunities to showcase and develop their skills through practical experiences, and to explore new pathways for developing 21st century skills. Particular attention was given to girls' participation, supported

[1] https://www.steamecologies.eu/wp-content/uploads/2024/09/D2.2_SLEs_Methodology-Updated-Version_v3_streamlined.pdf

by the creation of a dedicated toolkit of initiatives and strategies to promote female engagement in STE(A)M initiatives, the organization of a webinar on gender inclusion, and the emphasis on offering practical STE(A)M experiences through learning paths.

Figure 1 Map of implemented SLEs and stakeholders involved

Evidence and Analysis

Between October 2024 and May 2025, SLEs scaled from 13 pilots in the previous year (see policy brief 2)[2] to 109 across **16 European countries** namely Cyprus, Germany, Greece, Ireland, Spain, Italy, Israel, Malta, Macedonia, Norway, Portugal, Romania, Serbia, Slovakia, Sweden, Turkey.

In response to the scale and complexity of this growth, SLEs partners reinforced their facilitation mechanisms, launched international onboarding, updated support materials, and enabled national coordinators to tailor strategies to local contexts. Further details on the types and outcomes of these support structures are available in Deliverable 3.3 – SLEs Monitoring and Reflection Final Report[3].

Driven by the ambition to capture stakeholder experiences, SLEs collected two key datasets: 105 learning scenarios and 95 completed questionnaires. Quantitative data from the surveys were cross validated with qualitative insights drawn from the analysis of the learning scenarios. and consolidated through an online reflection workshop with initiators from participating countries.

An analysis of the SLEs' learning products complemented these insights. Learning products are central to the SLEs methodology, because they both represent the tangible outcome of learners' and stakeholders' co-creation and involvement, and **evidence learners' engagement and development of their skills, knowledge and competences**. The results of this analysis are provided in Deliverable 4.3 – SLEs Learner Engagement Evaluation Report [4].

These combined efforts provide valuable lessons for scaling Open Schooling, and informing policy recommendations. The main results are presented in the sections that follow.

STE(A)M Open Schooling policy enablers and frameworks in national countries

The implementation of SLEs across various European and associated countries has revealed a complex landscape of national policies, institutional cultures, and educator agency in relation to open

[2] https://www.steamecologies.eu/wp-content/uploads/2025/01/SLEs_2nd-Policy-Brief_final.pdf
[3] https://www.steamecologies.eu/wp-content/uploads/2025/10/D3.3-Ecologies-monitoring-and-reflection-final-report-1.pdf
[4] https://www.steamecologies.eu/wp-content/uploads/2025/10/D4.3-Learner-engagement-evaluation-report.pdf

schooling and STE(A)M education. While many countries possess formal or informal frameworks that support interdisciplinary, community-engaged, and project-based learning, significant challenges persist in mainstreaming these approaches into everyday educational practice.

Key Policy Enablers

Across the pilots, several policy frameworks and conditions emerged as **enablers** of open schooling and STE(A)M initiatives:

- **Curriculum flexibility and teacher autonomy**
    - Countries like **Romania, Sweden, Norway**, and **Germany** benefit from national or regional curricula that explicitly encourage interdisciplinary, project-based learning.
    - Tools like Romania's **"Curriculum at the School's Decision"** and Italy's **PCTO framework** legally enable partnerships with external stakeholders and real-world learning integration.
    - In Cyprus, while there is no formal open schooling policy, the **autonomy** granted to individual educators and schools and the availability of digital citizen science tools served as low-cost enablers of STE(A)M integration and community involvement.
- **National and regional strategies aligned with STE(A)M and open schooling goals**
    - Italy's **STEM Guidelines (2023)** and Malta's **National Education Strategy 2024–2030** prioritize sustainability, inclusion, and innovative teaching, supporting the values behind open schooling.
    - Turkey's **"Century of Türkiye Maarif Model"** promotes holistic, inquiry-based learning with clear interdisciplinary connections.
    - In Spain, regional programs like STEMbach (Galicia), STEMcat (Catalonia) encourage STEM vocation by promoting curricular and extracurricular initiatives for secondary school students with local industries and academic institutions.
- **Government-funds, international and EU programs**
    - Participation in **Erasmus+, eTwinning, Scientix**, and **TÜBİTAK** programs provided structural and financial support for STE(A)M activities in Romania, Turkey, Sweden.
    - In **Italy** and **Romania**, the involvement of schools in national or European networks (e.g. Scientix, and prior H2020 projects) contributed to teacher readiness and institutional openness to innovation.
    - Italy and Germany have capitalized on the national recovery plans or financial school plans such as **PNRR**, **PON**, and the **STEM Action Plan**, providing significant infrastructure, training, and equipment investment.
    - In **Cyprus**, most pilots were enabled by **EU project funding, the UNESCO SEMEP network** and informal science networks, mainly in biodiversity and marine science.
- **University and municipality engagement**
    - In countries such as **Norway**, **Italy**, and **Malta**, universities and local authorities play a critical role in bridging formal education with research outputs and societal and environmental challenges.
    - Projects anchored in **university-led initiatives** (e.g., NTNU in Norway) benefited from curricular and institutional flexibility to embed open schooling.
    - In **Portugal** and **Ireland** SLEs capitalized on prior collaboration frameworks between schools, universities, and local authorities, enabling rapid stakeholder mobilisation.

For what regards gender-inclusive STE(A)M education, while several countries have embraced innovation in STE(A)M through open schooling initiatives, **explicit gender inclusion remains inconsistently addressed <u>at the policy level</u>**. In countries like **Italy, Malta and Romania**, national or regional actors are beginning to embed gender-awareness within STE(A)M learning pathways. However, most national frameworks lack clear guidance on gender-responsive pedagogies, identity inclusion, or gender-disaggregated monitoring, suggesting that system-level enablers for equity in STE(A)M remain underdeveloped across Europe.

Key insights and findings from SLEs pilots

The SLEs across partner countries offer valuable insights into how Open Schooling and STE(A)M education can be adapted to local contexts, foster multi-stakeholder collaboration, and promote key competences in young learners. These results provide important evidence on the **potential** as well as the **enabling conditions** for implementing open schooling STE(A)M approaches at scale.

1. Curriculum integration and formal teacher recognition enhances relevance

One of the most consistent success factors across pilots was the alignment of SLEs with national curricula or school-level learning goals. This allowed projects to be conducted within regular class hours, avoiding the perception of open schooling as "extra-curricular."

- **Ireland**: Integrated plant growth monitoring into the Year 4 science curriculum, ensuring relevance and easy implementation.
- **Spain & Greece**: Designed sustainability-themed SLEs that aligned with science and digital skills objectives.
- **Norway**: Embedded Design Thinking methodology into the timetable, supporting iterative, inquiry-based learning
- In **Portugal**, SLEs has become a credited training course for educators who implement it. It's also an innovative way of training, because teachers learn 'by doing" an SLE with students, supported by the staff at the Ciencia Viva Centre.

***Policy recommendation*: Enable flexible curriculum frameworks and formal teachers' recognition that allow for interdisciplinary, project-based approaches.**

2. Multi-Stakeholder local collaborations amplify impact

SLEs involving external stakeholders—museums, research institutes, NGOs, businesses, and public bodies—created meaningful, real-world learning environments. These collaborations improved the quality of the activities and strengthened schools' visibility in their communities. They fostered an **ecosystemic approach**, where education was no longer siloed but connected to public science and community well-being. Moreover, in countries with a strong culture of participatory education or active local stakeholder ecosystems, pilots found it easier to initiate and sustain open schooling partnerships.

- **Italy**: Collaborations with research centres such as INAIL (on safety and inclusion), ISPRA (on environmental awareness), and CREA (on nutrition and biodiversity) enabled schools to access expertise, data, and tools that enriched the learning process.
- **Malta**: Partnered with the Malta Maritime Museum and other community actors to enrich the student experience.
- **Serbia**: Local NGOs, professionals, and civic actors co-facilitated sessions and hosted fieldwork.
- **Norway**: Parents, local welfare services, and data partners contributed to real-world relevance.
- In **Cyprus**, some SLEs leveraged local museums, NGOs, and citizen science platforms (eBMS), enabling direct student engagement with biodiversity and environmental data collection.

***Policy recommendation:* Encourage and fund school-community partnerships through national or municipal platforms.**

3. Inclusive STE(A)M design promotes equity and engagement

Projects that offered flexible formats and used inclusive pedagogical tools reported greater student engagement. In addition, several pilots demonstrated that when gender and identity considerations are integrated in the learning design, STE(A)M learning becomes more accessible and relevant to all students. Supporting teachers in adapting STE(A)M content to classroom diversity proved especially important.

- **Italy**: Used inclusive design via the SPAIC Toolkit and scenario-based learning paths integrating gender and identity to ensure that learners of different backgrounds and abilities could fully participate in the activities.
- Flexible activity scaffolding (**Romania, Greece**) enabled greater participation by girls and other underrepresented groups in STE(A)M
- **Norway**: addressed student diversity in coding experience through scaffolding, peer support, and differentiated tasks.
- **Cyprus**: Several projects involved predominantly female groups. The combination of outdoor learning, digital tools, and community engagement fostered confidence and participation among girls and students with previously low STEM interest.

> ***Policy recommendation*: Mainstream inclusive design and gender-responsive pedagogies in national STE(A)M frameworks and teacher training programs.**

4. Digital tools increase student engagement

When students engaged with technology,such as sensors, data analysis platforms, or app development, in the context of real-world challenges, they reported increased motivation, deeper understanding, and a stronger sense of competence.

- **Norway**: Piloted AI, IoT, and coding tools in realistic problem-solving, balancing complexity with student experience.
- **Spain**: Addressed AI ethics and data protection while empowering students to use AI responsibly.
- **Malta**: Used Padlet to coordinate multi-school projects, and remote tools to monitor air quality.

> ***Policy recommendation:* Invest in accessible digital tools and ensure ethical guidance in digital education.**

5. Societal challenges enhance student ownership and systemic learning

When students co-designed solutions to real-world societal issues—like food waste, marine pollution, or local urban planning—they demonstrated greater ownership, critical thinking, and civic responsibility. These projects confirmed what EU-level research has long suggested: that **community-based, challenge-driven learning** increases engagement, retention, and depth of understanding. Moreover, by integrating **STE(A)M content with civic education**, projects enhanced transversal competences such as teamwork, ethical reasoning, communication, and sustainability mindsets.

- **Serbia**: Students engaged in problem-solving for community-relevant environmental issues, later showcasing their solutions in public forums.
- **Italy**: Projects focused on themes like workplace safety, healthy diets, and biodiversity, encouraging students to see themselves as agents of change.
- **Norway**: Students developed solutions for welfare and sustainability problems using a stakeholder-informed design process.
- **Ireland**: Students explored environmental challenges in their immediate surroundings, fostering both place-based awareness and scientific curiosity.
- In **Cyprus**, projects addressing biodiversity loss, marine pollution, and paleoenvironments exemplified the integration of ecological literacy, digital tools, and civic engagement,

> ***Policy recommendation*: Support civic-oriented STE(A)M projects through funding, teacher training, and curricular flexibility that allows students to tackle community-relevant challenges.**

6. Student outputs have public value and enhance student agency

SLEs produced tangible outputs— such as videos, campaigns, guides, interactive guides, exhibitions— many of which were shared with local authorities or displayed in community events. This gave students a real audience and contributed to public awareness and civic engagement, showing that school-based projects can generate socially meaningful outputs beyond the classroom.

- **Italy & Serbia**: Student outputs were showcased in municipal events, school exhibitions, or community gatherings.
- **Norway**: Students developed functional prototypes that addressed societal challenges.
- **Malta**: Culmination events and workshops with external stakeholders gave visibility to student voice.
- **Cyprus:** Students sharing their findings with the public and peers through events, presentations, and online platforms. These dissemination activities helped students see their role as environmental stewards.

> ***Policy recommendation*: Incentivize public-facing educational outputs and promote civic visibility of school projects.**

Blockages and challenges in implementing SLEs

While the pilot implementation of SLEs demonstrated the potential of open schooling and STE(A)M to promote interdisciplinary, real-world learning, a common set of **systemic and practical challenges** emerged across participating countries. These blockages reflect misalignments between educational policy aspirations and the operational realities in schools.

1. Curriculum rigidity and time constraints

Time constraints and curricular overload remain widespread barriers to integrating open schooling into regular school activities. Indeed, across nearly all countries, rigid curricula and dense content requirements were identified as critical barriers:

- In **Ireland**, **Greece**, **Spain**, **Turkey**, **Serbia**, and **Germany**, the pressure to cover the prescribed curriculum limited teachers' ability to introduce interdisciplinary or exploratory projects.
- SLEs were often implemented **outside normal teaching hours** (e.g. **Malta**, **Serbia**, **Spain**), classifying them as “extra-curricular,” thereby reducing their visibility, institutional legitimacy, and accessibility for all students.
- In **Norway**, even with a more flexible curriculum, fitting time-intensive, creative activities into the school schedule was challenging, especially for collaborative or iterative methodologies such as **Design Thinking**.
- In **Cyprus** teachers cited a lack of dedicated hours for Open Schooling within the school calendar as a persistent challenge.

2. Lack of institutional support and policy priority

In several contexts, **open schooling is not yet recognized as a policy priority**, and institutional support is often absent or inconsistent:

- In **Spain**, teachers reported that their work on SLEs was neither institutionally acknowledged nor supported and came at personal cost in terms of time and workload.
- In **Turkey**, while national frameworks are evolving, **implementation gaps** across regions and **limited dedicated funding** make scaling open schooling difficult.
- In **Cyprus** and **Italy**, bureaucratic and administrative hurdles delayed or limited collaborations with external stakeholders, especially when **formal agreements** or **procurement processes** were required.
- In **Cyprus** educators often worked **without formal curriculum time or institutional support**, relying instead on voluntary commitment and project enthusiasm.

3. Limited financial and material resources

The **lack of dedicated funding** was a widespread challenge for many pilot projects:

- In **Italy** and **Cyprus**, project costs (e.g. transportation, materials) were often absorbed through informal contributions from stakeholders, teachers, or external projects.

- In **Malta**, logistical issues such as inadequate facilities (e.g. non-air-conditioned venues in summer) also posed a barrier, especially in out-of-school settings.

4. Teacher capacity and confidence

The successful integration of SLEs depends heavily on **teacher preparedness** and **subject confidence**, particularly for interdisciplinary initiatives:

- In **Greece**, **Turkey**, and **Romania**, some teachers reported a lack of training or confidence in teaching STE(A)M concepts, particularly when it was not their primary subject.
- In **Cyprus**, teachers need clearer methodological frameworks and practical, non-academic guidance—especially to scale up or guide newer schools in Open Schooling.
- Teachers often relied on personal initiative or peer support to bridge knowledge gaps—an unsustainable model without formal professional development structures.

5. Stakeholder coordination and engagement

Open schooling relies on collaboration among diverse stakeholders. Yet:

- **Israel** and **Germany** reported **fragmented stakeholder communication** or limited availability, leading to siloed interactions and reduced co-creation.
- **Serbia** and **Malta** experienced **logistical challenges** in coordinating activities across multiple schools or organizing field trips.
- In **Norway** and **Spain**, working with sensitive data (e.g. AI in public services or student information) highlighted the need for **data protection protocols** and **digital safety awareness**—areas where schools may lack expertise or capacity.

6. Sustainability and recognition

Even where SLEs were successfully implemented, concerns were raised about **sustainability**:

- In **Spain**, **Italy**, and **Malta**, reliance on volunteer time, goodwill, or temporary funding raised questions about how such initiatives could be institutionalized.
- Lack of **recognition for teachers' additional efforts**—whether through workload reduction, incentives, or professional credit—undermines long-term motivation and scalability.
- **sustainability of partnerships** after the pilot phase is a concern, particularly in areas with fewer institutional or financial resources.

Policy Implications and Recommendations

Policy recommendations

Policy Recommendation	Linked Challenges / Blockages	Challenge noted by	Implications for Scale-Up & Sustainability
1. Establish dedicated funding streams for Open Schooling	Lack of financial capacity to continue projects; extracurricular status of SLEs; underfunded schools	Italy Greece Spain Malta Cyprus	Financial support is a precondition for continuity and expansion—especially for materials, coordination roles, and teacher incentives.
2. Provide structured but flexible guidance for teachers	Lack of clarity in methodology for some; desire for more tools for co-design	Italy Malta Cyprus	Teachers want autonomy but also need adaptable guidelines and tools to sustain co-creation and integrate SLEs into curricula.
3. Allocate time and formal recognition for teacher participation	Teachers overstretched; SLEs often treated as "add-ons"; lack of institutional recognition	Malta Greece Ireland	Formal time allocation and recognition mechanisms (certificates, CPD credits) are key to making SLEs viable long-term.
4. Build formal coordination structures for school–community partnerships	Partnerships dependent on individuals; lack of sustained engagement mechanisms	Spain Cyprus Italy Turkey	To scale partnerships, schools need templates, role clarity, and support for stakeholder coordination.

Policy Recommendation	Linked Challenges / Blockages	Challenge noted by	Implications for Scale-Up & Sustainability
5. Develop peer mentoring and cross-school exchange networks	Lack of experienced guidance for newcomers; siloed practices	Spain Greece Malta	Networks of experienced SLE implementers can accelerate uptake and reduce entry barriers for new schools.
6. Support inclusive, gender responsive scenario-based design from the start	Inclusivity often addressed reactively; some students left behind	Italy Romania Greece Turkey	Embedding accessibility, gender sensitivity, and identity relevance improves equity and engagement system-wide.
7. Promote dissemination of student outputs in public and civic contexts		Malta Romania Italy	Recognizing and showcasing student work boosts motivation, civic engagement, and public support for Open Schooling.
8. Align SLEs with curriculum goals to ensure institutional fit	SLEs seen as extra-curricular or competing with required content	Ireland Greece Spain	Anchoring Open Schooling in existing curriculum frameworks improves feasibility and sustainability.
9. Provide ethical guidance and open-source digital tools	Unequal access to technology; unclear standards for AI, data use	Spain Norway Italy	Ensures responsible innovation while maintaining equity and low-cost implementation.
10. Leverage existing networks and innovation cultures to support open schooling uptake	Co-creation and partnership readiness varies; successful pilots often built on pre-existing collaboration structures	Germany Italy Romania Ireland Portugal	Capitalising on existing EU networks (e.g. eTwinning, Scientix), science centres, and prior project experience helps new implementers and supports scaling up
11. Foster and support distributed educational leadership for innovation	School or municipal leadership often key to implementation success, even without formal policy	Malta Cyprus Norway Serbia Turkey	Enabling distributed leadership and recognising local innovation champions builds ownership and momentum at local level

Implications for sustainability: a scalable vision with systemic support

The SLE pilot projects revealed significant potential for replication and sustainability but also identified key enabling conditions to scale up open schooling across educational systems. While several countries expressed readiness to continue or replicate their projects autonomously, long-term sustainability will depend on systemic support in key areas such as **funding, institutional frameworks, teacher capacity, and collaborative infrastructure.**

- **Financial support** is a precondition for continuity and expansion of SLEs even for motivated stakeholders
- **Cross sectoral partnerships are transformative but** maintaining them requires formal policy support and structured international/national coordination capacity and mechanisms.
- **Teachers** value autonomy and creative freedom in the methodology, but **need structured, adaptable tools** to co-design open learning paths, as well as **clear guidelines, time allocations, and recognition mechanisms.**
- **Peer-to-peer exchange**, both nationally and across countries is valuable for scaling up.
- SLEs work best when embedded in **school-wide strategies and curriculum**. **Problem-based learning,** where learners engage in real, problem-driven situations helps schools integrate curriculum goals with community relevance.

Overall, the SLE pilots confirmed that a **STE(A)M Open Schooling approach is scalable**, but only if supported by **policy frameworks and conditions** that value innovation, capacity building, inclusion, and community participation. Financial, institutional, and pedagogical investments are needed to move from pilot to policy and to embed these practices sustainably in European education systems.

Year 3 Project Outputs

- Portfolio of SLEs (30) – coming in November
- Learning scenarios (30) – Coming in November
- Read about the latest SLEs activities on the project's website: link here
- SLEs Methodology – Final Coming in December
- SLEs Deliverable 3.3 Learner Engagement Evaluation report
- SLEs Deliverable 4.2 Learning Path Interventions
- SLEs Deliverable 4.3 Monitoring and Reflection Report

Project Identity

PROJECT NAME	STE(A)M Learning Ecologies (SLEs)
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CONSORTIUM	• European Schoolnet (EUN Partnership AISBL), Belgium - Coordinator • Agenzia per la Promozione della Ricerca Europea (APRE), Italy • Center for the Promotion of Science (CPN), Serbia - Affiliated Entity • Centro Ciência Viva do Algarve (CCVALG), Portugal - Affiliated Entity • Ellinogermaniki Agogi (EA), Greece • European Network Science Centres & Museums (ECSITE), Belgium • Humboldt-Universität Zu Berlin (HUB), Germany • Ministry for Education, Sport, Youth, Research and Innovations (DCM), Malta • Museos Científicos Coruñeses (CASACIENCIAS), Spain - Affiliated Entity • National University of Ireland Galway (NUIGALWAY) - Affiliated Entity • Norwegian University of Science and Technology (NTNU) • University of Cyprus (UCY), Cyprus • WISTA, Germany
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WEBSITE	• https://www.steamecologies.eu/ • SLES - STE(A)M Learning Ecologies (scientix.eu)
FOR MORE INFORMATION	Contact the SLEs Coordinator at info-sles@eun.org

Collaborations

The SLEs project is part of the Open Schooling together (OStogether) network of projects and supported by the Scientix community for science education in Europe.

Further Reading

- D2.2 SLEs Methodology
- Open Schooling Policy Brief, Make it Open (MiO) and Schools as Living Labs (SALL) Horizon 2020 projects, with the support of the OStogether network.
- SLEs portfolio
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