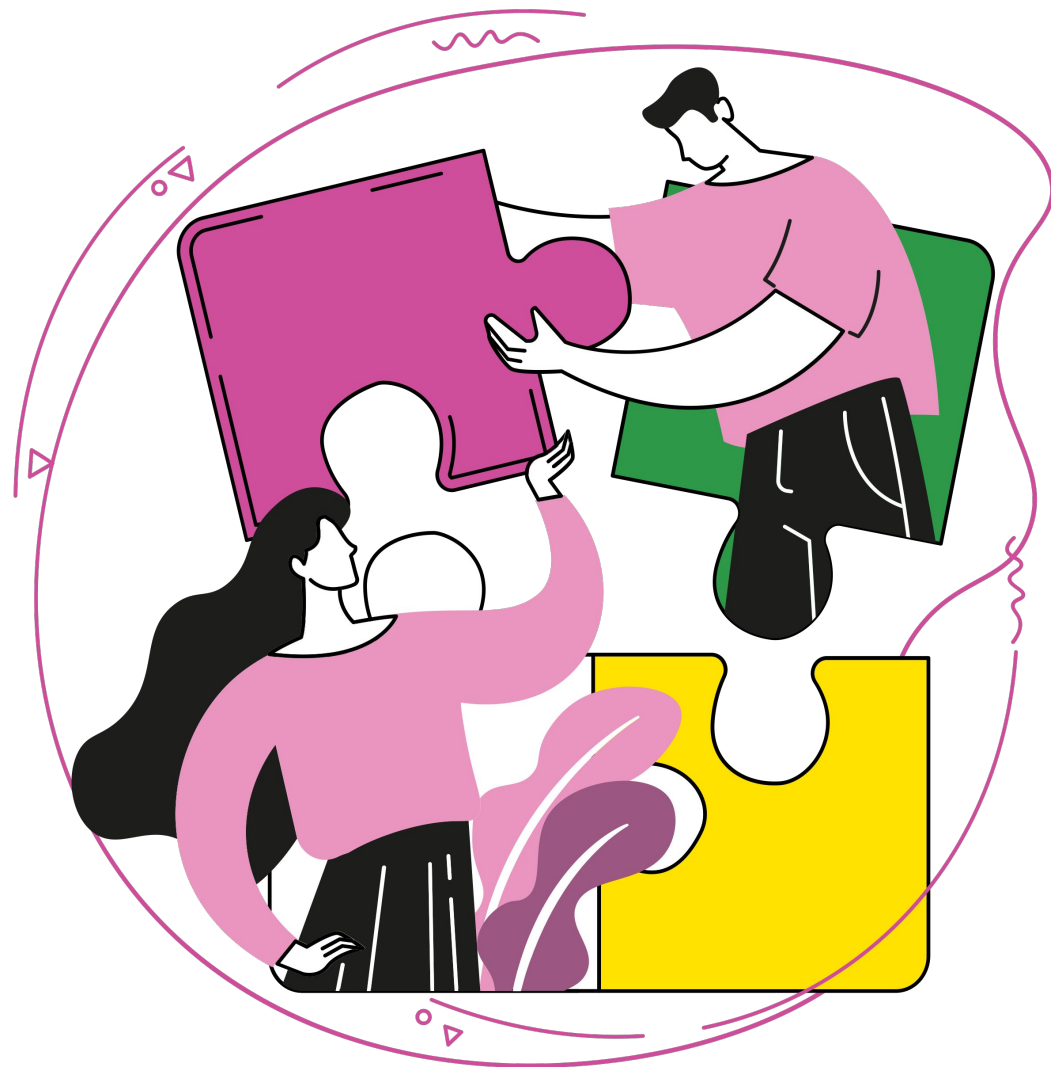




ROAD STEAMER

31/10/2025 - ESHA Conference, Rome

Elena Silvestrini, Senior Project Manager & Research
Associate, Lisbon Council



The Road-STEAMer project

<https://www.road-steamer.eu>



- 3-year project (Sept 2022- Aug 2025)
- Horizon Europe
- Main aim: developing a **STEAM Roadmap for Science Education in Horizon Europe**
- **Focus areas:**
 - Interplay between open science & open schooling
 - Secondary-tertiary education intersection

Road-STEAMer

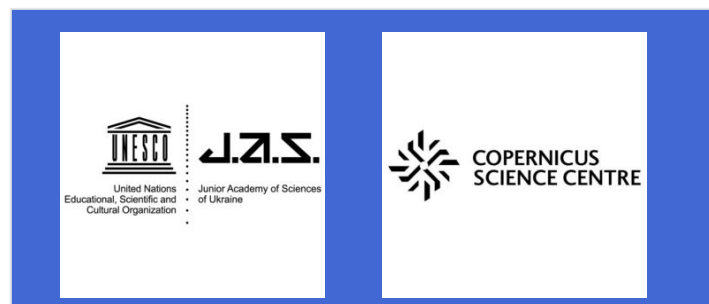
Aimed to develop a STE(A)M roadmap for science education in Europe, that is, a plan of action to **provide guidance to the EU's key funding programmes** for research and innovation on how to mainstream educational approaches that go beyond traditionally defined STEM, incorporating artistic and creative perspectives.

Objectives:

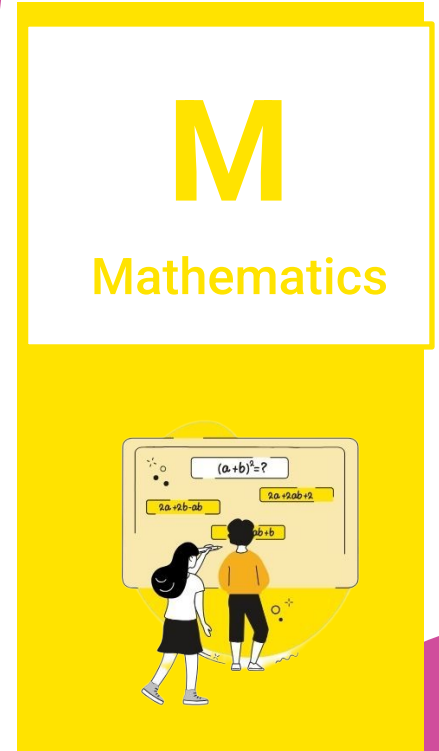
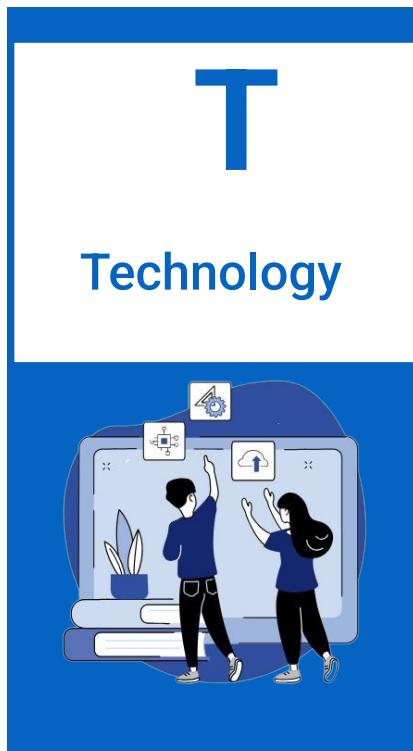
- Produce better knowledge and shared understanding of Europe's particular educational needs and how STEAM can address them.
- Explore the opportunities arising through STEAM for integrated science learning approaches and synergies.
- Study policy deficiencies that hinder the impactful adoption of STEAM approaches in Europe's science education landscape



Project consortium



What is STEAM?





It's not just subjects. It's a way of thinking.

STEAM education is about connection - between disciplines, people, and real-world challenges. It nurtures relational learning: **interdisciplinary, equity-based, hands-on, and culturally responsive.**

The Road-STEAMer framework highlights four learning approaches:

- **Experiential**
- **Cognitive**
- **Social-material**
- **Equity-oriented**

STEAM prepares young people for real life – not just exams.

STEAM helps students connect school to society. **It improves:**

Participation in science



Critical thinking and creativity



Empathy and collaboration



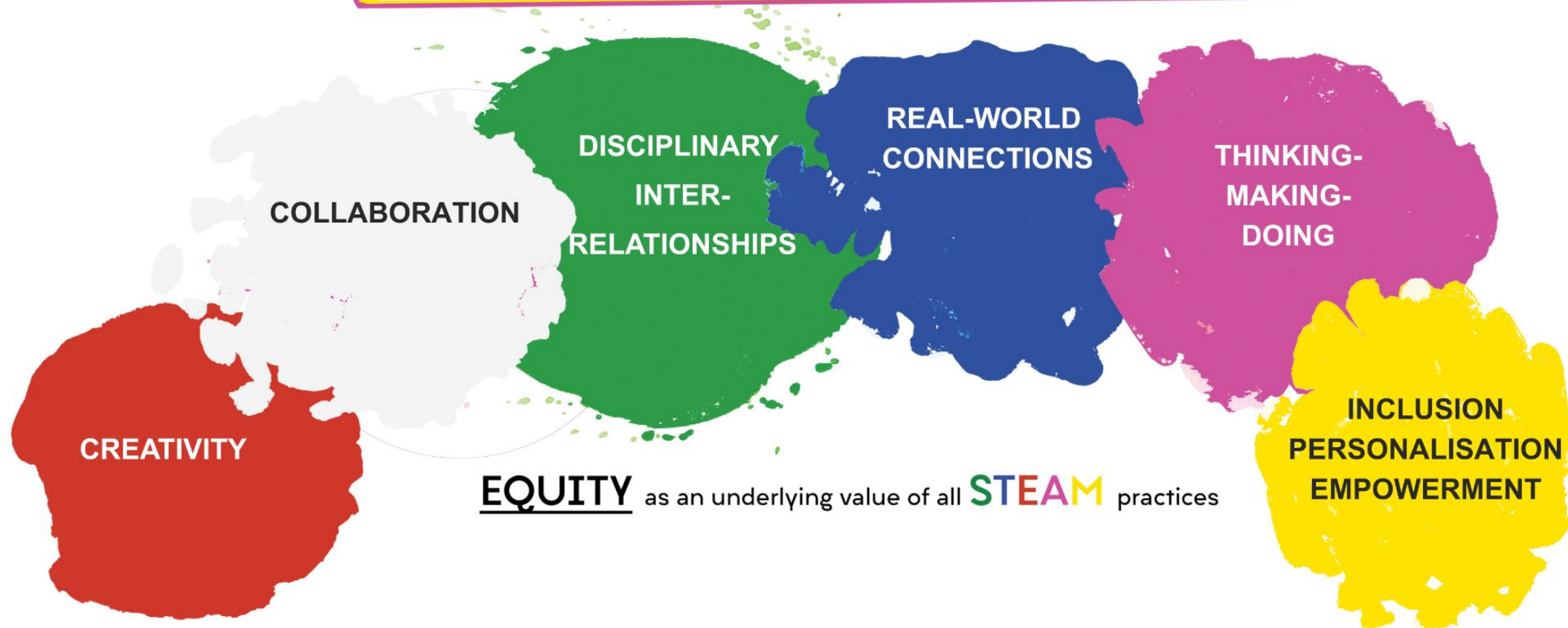
Community engagement



It supports inclusion, especially for underrepresented groups. Communities benefit when learning is linked to real-world challenges. You don't need to be a teacher to support STEAM—you just need to care about the next generation.

STEAM education in Road-STEAMer

Road-STEAMer is using these characteristics as criteria for mapping and analysing STEAM practices in Europe



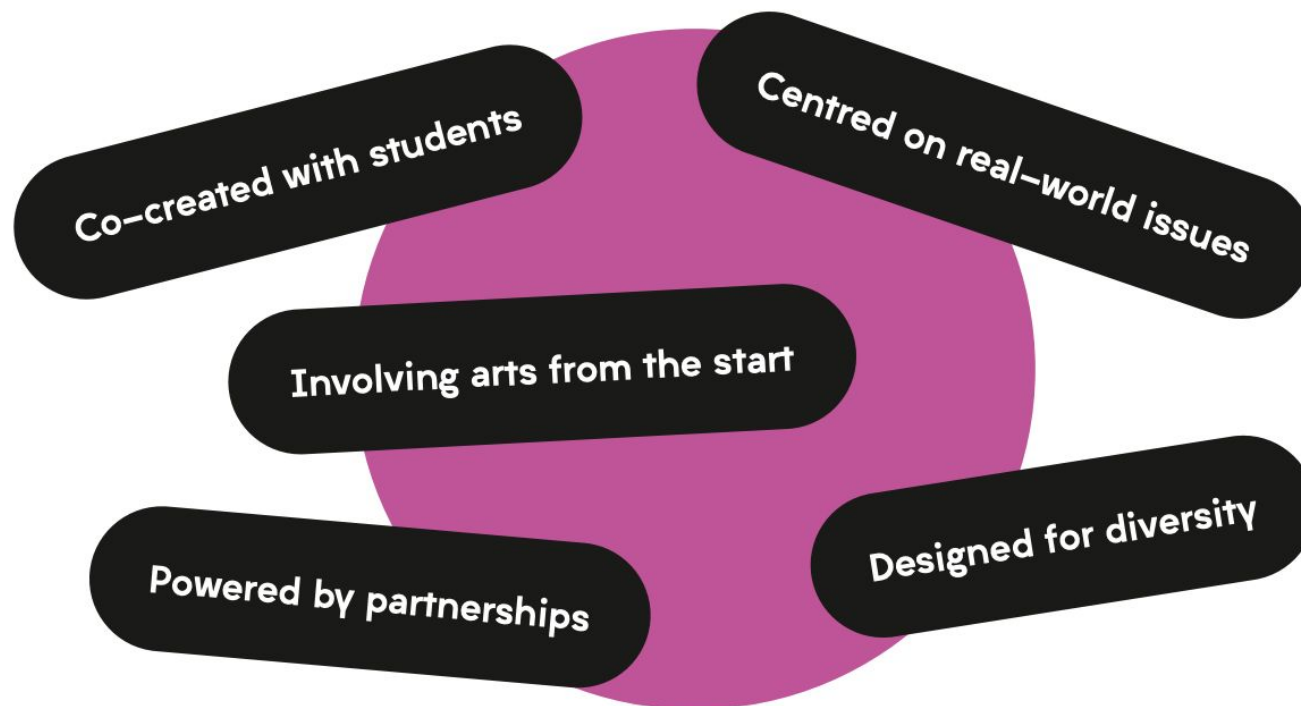
STEAM education criteria or characteristics

Chappell, K., Hetherington, L., Juilliard, S., Aguirre, C. and Duca, E. (2025). A framework for effective STEAM education: Pedagogy for responding to wicked problems. *STEAM Special Issue of International Journal of Educational Research Open*. 9, 100474, <https://doi.org/10.1016/j.ijedro.2025.100474>.



It's already happening – everywhere.

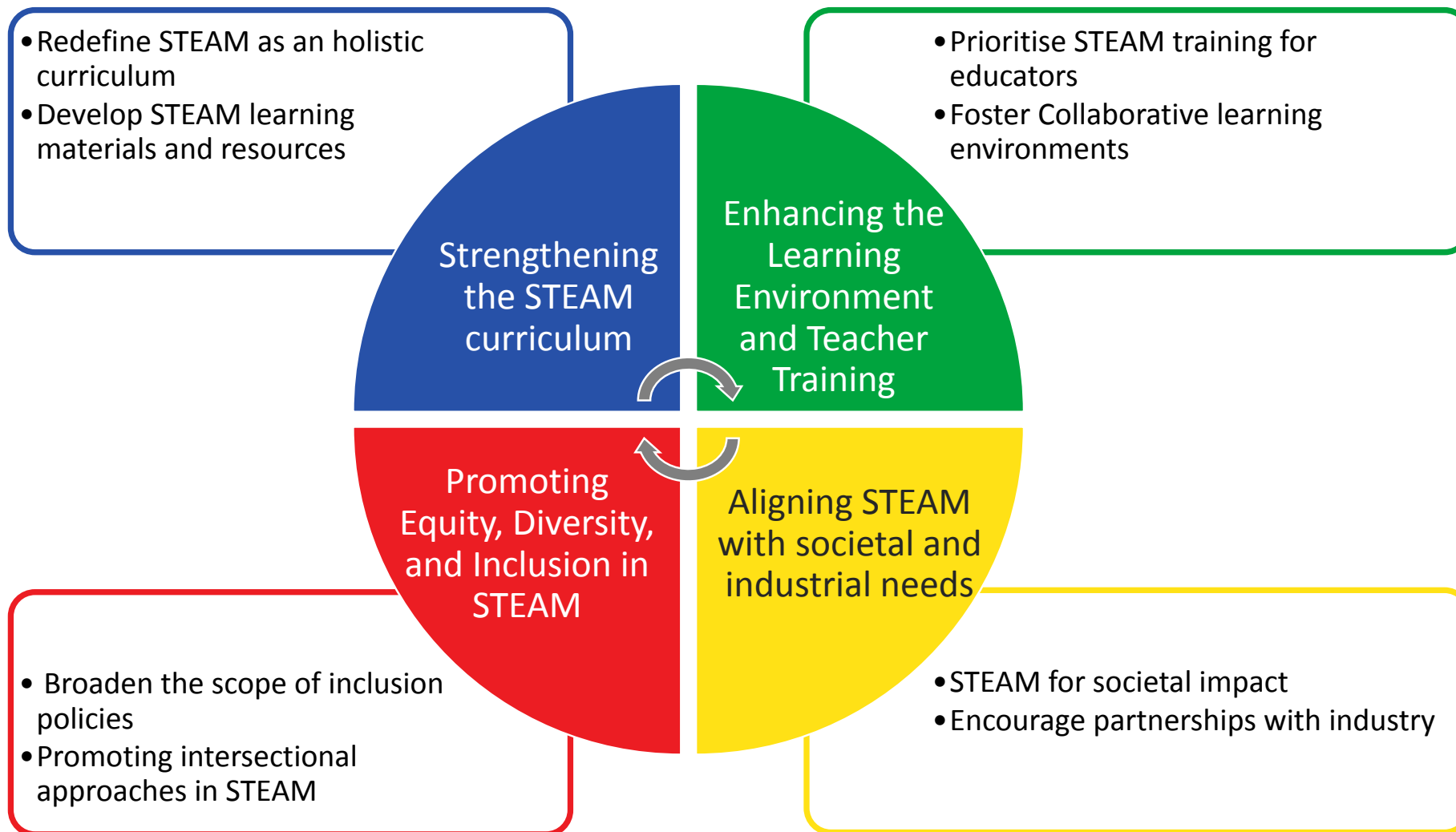
From local schools to museums and communities, real STEAM projects show how learning can be reimaged.



Scan to open the
interactive map of
STEAM practices!

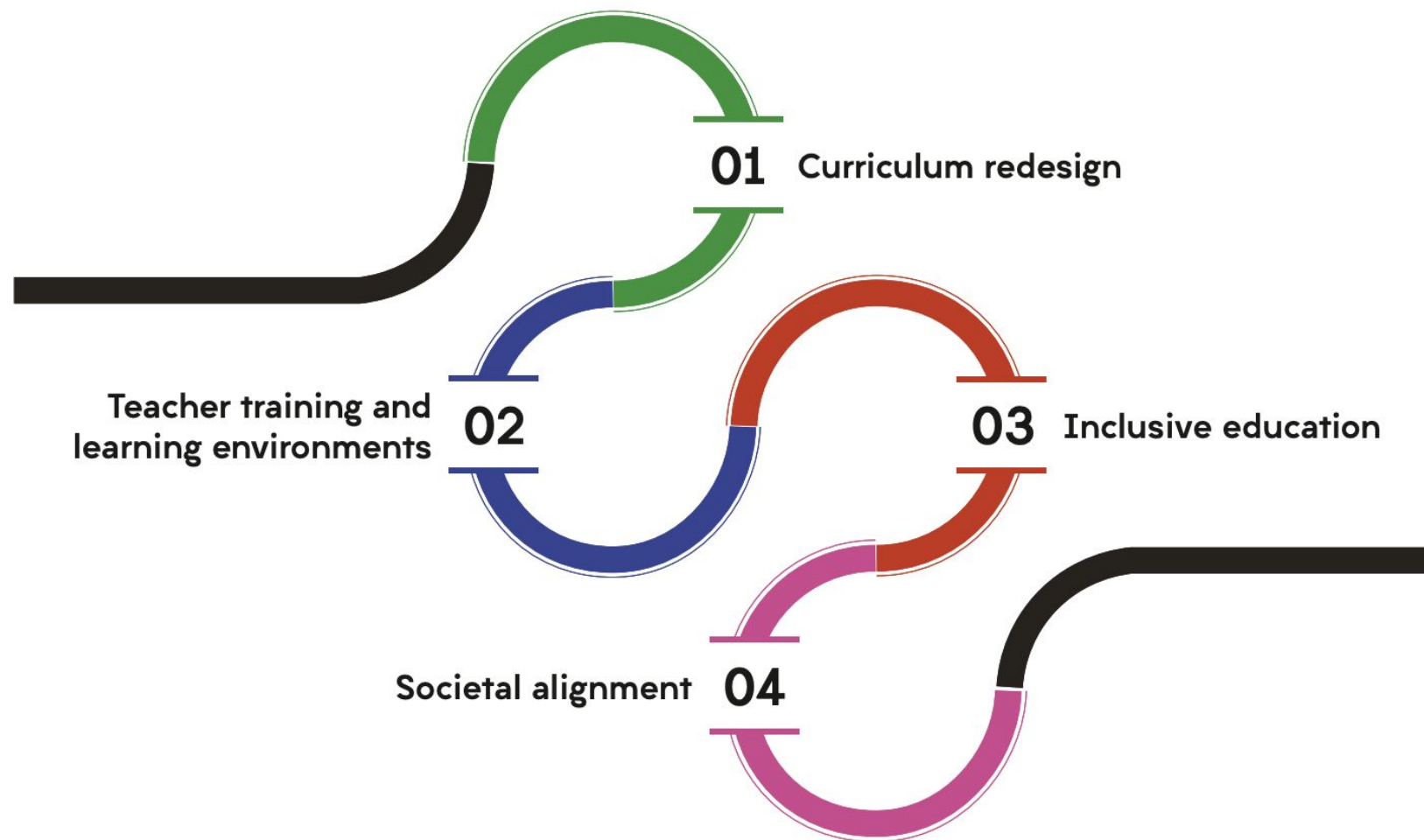
Browse dozens of examples from across Europe in our Interactive Map. Each project shows what's possible—with the right support.

Road-STEAMer's policy recommendations



A structured plan for long-term change.

The Road-STEAMer Roadmap identifies **four priority areas**:



Each includes specific actions and real-world examples. The goal? Systemic change that embeds creativity, collaboration, and inclusion in everyday education.



STEAM roadmap for Science Education in Horizon Europe

Funding Instruments: Horizon Europe and Erasmus (2026-27), FP10 (2028-2034)

[coordinating with: European STEM Executive Panel Union of Skills Council for societal challenges and EU national policies]

Mission Education - Systemic change of the educational system and assessment: skills-focused, transdisciplinary, inclusive, AI-enabled

Relevant for:

- Research (DG RTD)
- Education (DG EAC)
- Employment (DG EMPL)
- ICT and digital (DG CNECT)
- STEM strategic plan

Expands the STEM strategic plan

What is STEAM?

Actions categorisation

Research actions

		Past	STEM edu strategic plan	2026	2027	2028	2029	2030	2031	2032	2033	2034
Strengthening the STEAM Curriculum at National and EU level	Priority area 1	1A	Redefine STEAM as a Holistic Curriculum across Europe	EU Transnational definition and design of what is a STEAM holistic curriculum / school / university and assessment			Development and testing of a STEAM transdisciplinary curriculum and assessment at secondary, vocational and university education level in lighthouse institutions					
		1B	Develop STEAM Learning Materials, Teacher Resources and incentives	Investigation of what the arts, design and creativity bring to STEAM education and derive best practices								
				STEM competence framework 2026								
				Systematic organization and testing of STEAM teaching material, practices and assessment								
Enhancing Teacher Training and the Learning Environment	Priority area 2	2A	Prioritize STEAM Training for Educators and school/ university leaders	Training for school heads, school leaders, university deans and policy makers on STEAM								
		2B	Foster inclusive and supportive Learning Environments harnessing AI and digital tools	Integrate STEAM education in Horizon Europe Pillar 2 calls			Doctoral network on STEAM					
				EU University alliance on STEAM								
				Research on STEAM (lack of) career selection								
Aligning STEAM education and career design with societal and industrial needs - STEAM literate citizens	Priority area 3	3A	Develop STEAM career design and integrated learning pathways	Development of networks, centres and alliances (incl. equipment) of teachers/lecturers/ head teachers/principals for mutual learning on STEAM								
		3B	Support agile partnerships with organizations to address industry and societal needs	Deployment and investigation of new approach to teachers' training (pre-service and in-service) for transdisciplinary education								
				STEAM career design								
				STEAM career exploration centers								
Promoting equity with transdisciplinary, effective inclusive STEAM education paradigms promoting equity	Priority area 4	4A	Establish flexible, inclusive and supportive STEAM education	STEM skills founderies 2026			Funding for EDTECH startups to promote STEAM					
		4B	Promote Intersectional approaches in STEAM, improving accessibility	Schools/university collaborations with local actors								
				Capacity building in public administrations for multi-stakeholder collaborations (open-schooling)								
				Joint diplomas, degrees, microcredentials with industry/civic organizations - fast tracking creditization at EU level								
				An economic case for inclusive STEAM education in secondary and tertiary education								
				Learning Environment design and its impact on learning outcomes								
				Effectiveness of STEAM and transdisciplinary learning paradigms to support learning preferences and needs of diverse learners to increase inclusivity and improve skills								
				STEM Futures: in 2026 succesful practices for girls and women								
				Mentorship programs and scholarships for underrepresented groups								
				Investigate the efficacy of policies to increase hybrid and blended learning to make STEAM educational more accessible								

<https://www.road-steamer.eu/>

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No. 101058405



Funded by the European Union

Past | STEM edu strategic plan |

HE

2026

2027

FP10 2028

2029

2030

2031

2032

2033 2034

Union of Skills



Roadmap future digital education and skills

EU teachers and trainers agenda

AI in education initiatives

Increasing accessibility of higher education

Priority area 4

Promoting equity with transdisciplinary, effective inclusive STEAM education paradigms


4A

Establish flexible, inclusive and supportive STEAM education

HE
2026-27

FP10
2028-34


4B

Promote Intersectional approaches in STEAM, improving accessibility

HE
2026-27

FP10
2028-34

EM Executive Panel Union of Skills and EU national policies]

An economic case for inclusive STEAM education in secondary and tertiary education

Investigate the efficacy of policies to increase hybrid and blended learning to make STEAM educational more accessible

Effectiveness of STEAM and transdisciplinary learning paradigms to support learning preferences and needs of diverse learners to increase inclusivity and improve skills

Learning Environment design and its impact on learning outcomes

Mentorship programs and scholarships for underrepresented groups

Update the Digital Education Plan to have a broader definition of inclusivity

Action

Effectiveness of STEAM and transdisciplinary learning paradigms to support learning preferences and needs of diverse learners to increase inclusivity and improve skills

Longitudinal study to systematically test a variety of STEAM and transdisciplinary learning options to support diverse learning preferences and diverse assessment (skills-based), integrating the EU Digital Compass and Life Comp. To support the EU and Member States in defining and adopting a unified STEAM education strategy, research should be conducted to on the effectiveness of educational paradigms and available learning options to replace or heavily revise traditional national education paradigms. Interdisciplinary skills-based (rather than knowledge-based) educations, focused on real word challenges, can provide several economic benefits to European nations, off-setting the cost of a systemic change to the EU educational system. Research should test (i.e., with experimental trials) multiple STEAM and transdisciplinary (existing or new) learning approaches and evaluate which approach is most effective for which type of learner, including learners with disabilities or belonging to vulnerable groups (incl. intersectionality); such program include Universal Design for Learning (to be applied to STEAM education), the International Baccalaureate with STEM (in particular the Career-related Program), the Finnish STEM education program, etc.

H-Farm

A secondary education teaching program based on the holistic International Baccalaureate curriculum expanded to include STEM in collaboration with the Italian Institute of Technology (IIT), integrates science, research, and innovation, fostering interdisciplinary learning and technological advancements in education and cultural heritage. The International Baccalaureate has proven more successful than national curricula in improving students skills (Dulun& Lane, 2023)

School of Humanity (online middle and high school)

Developed in the US with learning hubs worldwide, it partners with schools and with industries. It received several awards and it is based on a balance of interactive online learning, with time for offline, parent-led activities instead of subjects, learners have daily workshops.

UDL-BOE Blended learning in schools

A project funded by Erasmus+ it focuses on developing practical tools to help teachers deliver effective and engaging learning in a digital space, addressing two key areas: inclusion and digital pedagogical competences, with the main target group being second-level teachers. The approach will be based on the Universal Design for Learning (UDL) framework (Cast.org), an inclusive approach to teaching and learning that offers all students an equal opportunity to fulfil their potential. This framework offers students different options for accessing, building and internalising learning.

More examples: IN-STEAM

International Baccalaureate transdisciplinary program,

IB in public schools
IB in Greece

Teacher Academy course "Universal Design for Learning: Strategies and Digital Tools to Support All Learners" and "Multi-Tiered Support System (MTSS) and Universal Design for Learning (UDL) for Academic and Behavioral Growth"

SpicE academy
Still I rise

Potential funding instrument

Horizon Europe Cluster 2 destination "Innovative Research on Social and Economic Transformations" and Erasmus+

Suggested time frame: 26-27 and FP10 (2028-34)

Alignment with STEM Education Strategic Plan 2025

This action expands the plan to broaden its impact on under-represented and marginalized groups and increase employability.

Related policy recommendations: SEER D7.2 Road-STEAMer recommendation 7 D3.3

Evidence: Dulun& Lane, 2023 Thoma, Farassopoulos & Lousta, 2023 Road-STEAMer D4.2 Quigley et al., 2019

Action

Update the Digital Education Plan to be more inclusive

Revise the Digital Education Plan ensuring that it covers all underrepresented groups to access digital education and a more complete definition of equity and inclusivity in addition to gender(s), to consider physical and mental disabilities, neurodivergence, diverse abilities, sensory needs, socio-economic background, mobility limitations, language and literacy competence. In particular, action 13 of the DEAP should be expanded to incorporate more diversity not just across the gender spectrum, but incorporating other identity lines such as race, disability and class in a truly intersectional approach. In this sense it is essential to ensure that learning materials for digital education are designed with a multiplicity of needs in mind, adopting a Design for All approach.

Equity is about the systemic or structural attention to giving everyone access to things in the right way for their needs. The shift to more inclusive practices should be reflected in KPIs and other targets, moving beyond a mere increase in the number or percentage of women (or other underrepresented groups) studying, working and doing business in digital and STEM fields, towards more comprehensive measures of inclusive representation, including at a minimum measures of diversity at all level of the organisation, within decision-making bodies, pay equity and chances of career advancement including diverse abilities and sensory needs, as well as (reduction in) cases of discrimination and harassment.

Potential funding instrument: Digital Education Plan

Suggested time frame: 2026

Alignment with STEM Education Strategic Plan 2025

Related policy recommendations: Road-STEAMer recommendation 7

Evidence: in the Digital Education Action Plan 2021-2027 (DEAP), STEAM is mentioned in Action 13 as a way to increase women's participation in STEM studies and careers – just intended as an instrument to improve the outcomes of STEM education, without making fundamental changes

Díaz-García, C., González-Moreno, A., & Jose Sáez-Martínez, F. (2013) Carter et al., 2021

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Examples

H-Farm

Centre Program Primary-High school University

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UDL-BOE Blended learning in schools

Project (Funded)

Interactive tool Middle High school

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Potential funding instrument

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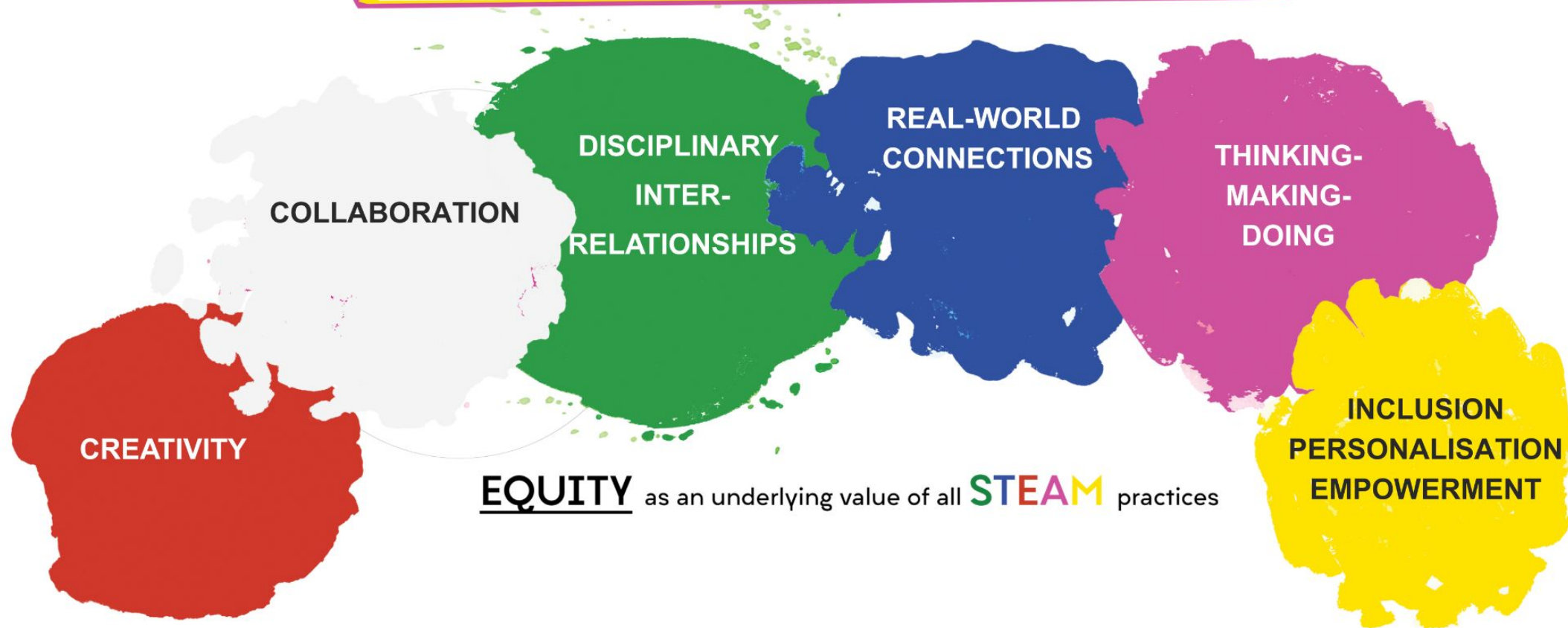
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Your understanding of STEAM:

How do the Road-STEAMer criteria for STEAM relate to your experiences/understanding of STEAM?

STEAM education in Road-STEAMer

Road-STEAMer is using these characteristics as criteria for mapping and analysing STEAM practices in Europe



Please look on your chairs

In small groups, please discuss the criteria in relation to your own experiences/understanding of STEAM.

If you feel a particular criteria/characteristic is missing, please use the blank piece/s of paper to add it.

Choose one representative of the table that will summarise your insights in 1 minute.

Thank You

(Further info
elena.silvestrini@lisboncouncil.net)