CESAER

The strong and united voice of universities of science and technology in Europe

Strengthening STEM education for Europe's scientific and technological future

Position paper dated 10 November 2026

Introduction

CESAER, the strong and united voice of universities of science and technology in Europe, welcomes the growing political recognition of STEM education and human capital as foundations for European competitiveness. We call for a future-oriented approach to STEM education that connects participation ambitions with educational quality and long-term scientific capability. Europe's capacity to use artificial intelligence (AI) effectively and responsibly, advance the green and digital transitions and address societal challenges depends on people who can create scientific knowledge, develop new technologies, exercise critical judgement and apply their expertise as technologies and professions evolve.

Universities of science and technology bring a distinctive contribution to this undertaking. By integrating education, frontier research and innovation, they enable students to create knowledge and address complex problems in collaboration with industry and society. Their experience across Bachelor's, Master's and doctoral education and lifelong learning connects insights into emerging scientific and technological developments with an understanding of evolving competence needs and the conditions required to meet them. This also enables universities to anticipate scientific and technological developments and related competence needs that may not yet be visible in current labour-market evidence. This expertise should inform STEM policy from the outset.

Europe's STEM ambitions require sustained investment in the people and institutions responsible for delivering them. Expanding participation must go hand in hand with strong preparation, successful progression and the capacity to educate more students well. Educating more STEM students to a high standard requires sufficient educators, technicians, supervision, laboratories, digital infrastructure and student support, as well as resources to operate, maintain and renew the facilities on which STEM education depends. Rising expectations of universities cannot be reconciled with budget cuts or the erosion of their public funding. Curriculum renewal requires equal care: scientific foundations give graduates the depth to understand new developments, while interdisciplinary learning, independent

judgement and the capacity to continue learning equip them to respond to the evolving needs of working life and society. Universities need the resources and autonomy to bring these objectives together.

Drawing on exchanges and input from CESAER's university leaders and experts, this position identifies six priorities for European and national action to strengthen STEM education and the continued development of competences throughout life. It builds on our white paper 'Engineer of the Future' (April 2024), our position on the Union of Skills (June 2025) and our industrial doctorates report (March 2026), as well as our positions on sustainable funding for universities (March 2020) and research and technology infrastructures (June 2025). It develops the educational dimension of our Union of Skills position in the context of the implementation of the STEM Education Strategic Plan, focusing on the conditions universities need to provide high-quality STEM education from preparation and entry into higher education through to doctoral education and lifelong learning.

Recommendations

We call on EU member states and the EU institutions, within their respective spheres of competence and with due regard for university autonomy and academic freedom, to:

Involve universities in STEM policy design and skills foresight

- Ensure systematic involvement of universities of science and technology from the outset in the design, implementation and review of European and national STEM policies and skills foresight, including through the implementation and governance of the STEM Education Strategic Plan and the Union of Skills. Draw on their expertise in research and education, alongside labour-market evidence and input from students, employers and other stakeholders, to anticipate emerging scientific and technological developments as well as current competence needs, and to address long-term societal challenges.

Match STEM ambitions with investment in capacity and quality

- Accompany ambitions to increase STEM participation and the number of graduates with stable, multiannual public investment in higher education institutions across Bachelor's, Master's and doctoral education. Ensure investment in staff, supervision, laboratories, digital infrastructure and student support is commensurate with these ambitions and sufficient to maintain high-quality education, including the operation, maintenance and renewal of facilities and infrastructure, taking account of national needs and institutional capacity.
- Monitor retention, completion, competence development and graduate outcomes alongside enrolment, using existing evidence where possible and taking account of institutional contexts and student populations. Ensure monitoring is proportionate and avoids additional reporting burdens or incentives that could discourage institutions from admitting and supporting students requiring additional support. Use existing good practice and design principles for monitoring frameworks.
- CESAER reiterates its call for sustainable university funding, including a commitment to establish and achieve a public investment target for higher education benchmarked against the world's leading performers. At European level, CESAER calls for at least €200 billion for FP10 and €60 billion for Erasmus+ for 2028–2034, with predictable and protected programme budgets. These European investments should complement increased and sustained national funding for the people, services and infrastructure universities need to fulfil their missions.

Enable curriculum renewal while strengthening scientific foundations

- Ensure that policy and regulatory frameworks enable universities to adapt STEM curricula to scientific and technological developments, the green and digital transitions, and changing professional and societal needs.
- Support universities, including financially and through enabling legislative and policy frameworks, in strengthening students' mathematical, scientific and disciplinary knowledge and developing critical judgement, while ensuring that the integration of transversal competences, sustainability, ethics and AI-related competences builds on and reinforces these foundations within coherent programmes. In European and national policy initiatives, avoid treating each emerging priority as requiring a separate addition to curricula.
- Take account of programme workload and the learning objectives at different educational levels. For AI-related competences, support integration suited to disciplinary and educational contexts, in line with CESAER's input note 'Skills and competences for the era of AI: Perspectives on higher education from universities of science and technology' (November 2026)

Strengthen preparation, transitions and inclusive progression

- Provide sustained funding and incentives for coordinated cooperation between universities, schools and other educational providers to strengthen preparation in mathematics, science and reading comprehension and improve transitions into higher education, and support the scaling of effective approaches beyond individual projects.
- Ensure that national authorities adequately resource school systems, including the recruitment, retention and professional development of school STEM teachers and pupils' practical engagement with science and technology, including opportunities to engage with scientific inquiry and knowledge creation. University partnerships supporting these efforts should be properly resourced to contribute to informed and positive perceptions of STEM study and career pathways among pupils and the wider communities supporting their educational choices.
- Resource bridging activities, mentoring and timely academic support for students entering university. Address financial barriers and support institutions in providing accessible learning environments, challenging gender stereotypes and improving participation and progression among underrepresented groups.

Support research-based teaching and educational innovation

- Provide funding for universities to develop research-based, project-based and interdisciplinary STEM education that strengthens students' ability to bring together different forms of expertise and make informed decisions when addressing complex problems, including at Bachelor's level and through collaboration between STEM and non-STEM students. Support opportunities, where relevant, for students in non-STEM disciplines to engage with STEM knowledge, methods and technological developments.
- Support higher education educators' professional development and the time and pedagogical expertise required, and encourage recognition of teaching, mentoring and curriculum development in academic careers.

- Strengthen educational partnerships with industry, public authorities and civil society to enhance the relevance and attractiveness of STEM learning pathways, while preserving universities' responsibility for curricula and academic quality.
- Support research and evaluation of different educational approaches to understand their effects on learning and competence development, and facilitate European exchange of findings, including approaches that have not achieved their intended outcomes, through instruments and frameworks such as Erasmus+ and European University Alliances. Promote common evaluation frameworks for STEM support programmes to enable comparison and better understand their collective impact.
- Support strong research environments, high-quality supervision and opportunities for doctoral candidates to collaborate with industry and other sectors within a diverse doctoral landscape, as described in our industrial doctorate report (March 2026). Strengthen the MSCA while safeguarding its role as a bottom-up, excellence-based programme open to all disciplines, including its support for collaborative and industrial doctoral training.

Enable lifelong development of STEM competences

- Support universities, including financially and through enabling legislative and policy frameworks, in developing students' capacity for independent and lifelong learning and providing flexible opportunities to deepen, renew and apply STEM knowledge throughout their careers.
- Provide sustainable funding for continuing education, reskilling and upskilling, including quality-assured micro-credentials that complement degree programmes. Address barriers to employer recognition of micro-credentials, cost and compatibility with employment, and support cooperation with employers and other partners to combine scientific depth with relevance to evolving professional and societal needs.

Conclusion

Strengthening STEM education requires sustained investment and coherent action across the educational pathway, with attention to both immediate barriers and long-term development.

CESAER strongly supports a major strengthening of STEM education as essential to Europe's scientific and technological future. But ambition without investment will not deliver results. If Europe is serious about educating more people in STEM, it must also substantially strengthen the short- and long-term funding provided to universities at EU, national and regional levels. Otherwise, laudable political ambitions to substantially strengthen STEM education risk remaining little more than words on paper.

CESAER stands ready to contribute the expertise and experience of universities of science and technology to European and national efforts to strengthen STEM education, including through the contributions of the CESAER Envoy to the STEAM Executive Panel and the CESAER Envoy to the European Skills High-Level Board.

More information and contact

For more information, please contact our Advisor for Benchmark & Higher Education, Touko Närhi.

This document can be referenced using: https://doi.org/10.5281/zenodo.24103384

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