



Picking up steam

Policy brief summary

4 priority areas

Encourage the uptake of STE(A)M careers to counter the skills crisis

Increase diversity in STE(A)M to enrich the field with new perspectives and have a wider pool of professionals

Increase science and arts literacy for all so that no-one is left behind in an increasingly technological world

Align education with tomorrow's societal needs to tackle complex problems

Road-STEAMer aims to develop a STEAM roadmap for science education in Horizon Europe, i.e. a plan of action that will provide guidance to EU's key funding programme for research and innovation on how to encourage more interest in STEM through the use of artistic approaches, involving creative thinking and applied arts (the "A" in 'STEAM').

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

The problem

Europe is currently facing a lack of skilled employees, particularly in sectors such as Science, Technology, Engineering and Mathematics (STEM), and the situation is not much different elsewhere in the world.

Beyond the overall scarcity of STEM professionals, another issue is the persistent underrepresentation of women and marginalised groups in these fields of employment. This is not just a problem for those who are excluded. Increased diversity could provide different understandings of scientific and technological problems, leading to pursuing alternative solutions and more inclusive products – ultimately, society as a whole could benefit.

Furthermore, a solid background in science education could be beneficial for all citizens (regardless of occupation), in order to better support them in an increasingly complex and digitised world. This poses huge demands on educational systems, unlikely to be met with instruction-as-usual.

The STEAM solution

Education pioneers and experts advocate for up-to-date approaches to science and related subjects such as "out-of-school science activities," open schooling, and the use of arts and creative thinking (the "A" in STEAM), which have the potential to increase student engagement, be more inclusive of marginalised groups, and foster the development of soft skills and interdisciplinary practices.

Taking stock of the work carried out during the first year of the Road-STEAMer project, the following four areas emerged as priorities for policy development:

Developing a STEAM roadmap for science education in Horizon Europe

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- **Encourage the uptake of STE(A)M careers.** This has mostly to do with increasing students' engagement, particularly at the critical stage between secondary (high school) and tertiary education (university), challenging widespread perceptions of scientific subjects and careers being “difficult”. There are indications that a STEAM approach could be more inclusive and appealing than traditional STEM instruction, potentially broadening the number of aspiring scientists. In particular, STEAM could challenge the perception of science as “difficult” and tedious, whereas the inclusion of arts and creativity could foster confidence and motivation.
- **Increase diversity in STE(A)M.** It is almost universally acknowledged that women and ethnic minorities are generally under-represented in scientific professions. Simply by tapping into a wider pool of potential scientists, increasing the number of women and other underrepresented groups STEAM will increase the total number of STEAM professionals, which is in general desirable. But there is more to it. It can be argued that overcoming exclusionary employment practices in STEAM would bring an added value by broadening horizons and frames of reference, and reducing the risks of biased technology and research.
- **Increase science and arts literacy for all.** Not everybody needs to be a scientist or artist professionally, but pretty much everybody would benefit from improved science and arts literacy. Being able to make sense of available data, and weeding out unsupported claims, requires critical thinking and an understanding of the scientific method; changing minds in relation to how to ethically respond to e.g. the climate crisis requires understanding of creative, collaborative, cultural and aesthetic values. Giving everyone the tools to understand and competently navigate an increasingly digital, often much more visually represented and automated world is another example of an area where better technological and artistic skills would be helpful, regardless of sector of employment.
- **Align education with tomorrow's societal needs.** This means thinking beyond what is needed by industry in the “here and now”, focusing instead on what will remain relevant in the decades to come for society - and people within it - to flourish. From this perspective, encouraging the development of soft skills, critical thinking and creativity, interwoven with mastery of the method of scientific inquiry, appear to be of crucial importance. Tackling real-world problems - oftentimes working across disciplinary boundaries - appears to be a promising path to making education more relevant.

Over the remaining two years, further research on best STEAM practices and on the policy context will allow the project team to define specific sets of policy recommendations, and to develop a roadmap for STEAM education in Europe.

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