



EUROPEAN POLICYBRIEF



READY FOR BOLD CHOICES? TOWARDS INCLUSIVE AND GENDER JUST FUTURE MAKING IN STEM

“Gender inequalities and stereotypes persist in our societies, and we must work together to remove the barriers that prevent women from reaching their full potential in every field, including STEM. We need to build a future where women and girls can equally contribute to and benefit from scientific and technological advancements”

October 2024

SUMMARY

Europe faces multiple social challenges, such as an urgent need to address sustainability and technological change. These imminent issues, coupled with declining student interest and performance in science, require a scientifically literate and democratic society, thus necessitating transformative and inclusive science education.

Persistent gender stereotypes, educational segregation, and socioeconomic barriers limit equitable access to STEAM education. Women remain underrepresented in STEM and higher education leadership, while marginalized communities encounter compounded challenges from limited educational resources and structural inequalities.

The SENSE project advocates for gender-equitable and inclusive STEM education by harnessing the transformative power of science and fostering social creativity through transdisciplinary STEAM approaches. Targeting barriers that affect disadvantaged groups, SENSE. empowers learners of all ages, genders, and backgrounds to pursue STEAM fields. Addressing these disparities promotes equity and yields economic benefits through improved scientific literacy, workforce readiness, and diversity.

EU policies envision accessible, gender-equal education across all sectors, yet Europe is still far from reaching these goals. Despite numerous initiatives, progress has been slow, highlighting the urgent need to recalibrate and strengthen our approach to science education.

Through rigorous research and development, SENSE. provides innovative educational alternatives that enhance both learner experience and outcomes in science education. Evaluations indicate strong STEM identities among female participants, with high levels of engagement, wellbeing, and interest. The SENSE. project employs the following approach:

- **Learner-Centred Pedagogy** – Shifts students from passive recipients to creators of knowledge, fostering self-directed learning and empathy
- **Reflective Feedback** – Encourages self-assessment and social creativity
- **STEAM Inquiry** – Blends scientific and artistic inquiry, fostering processes of creation and critical thinking.
- **Citizen Science & Participatory Art Practices** – Engages students with real-world scientific and artistic practices to approach community issues.

This brief focuses specifically on social creativity and gender inclusion, and advocates for the following recommendations:

1. **Inclusive Needs Assessments** – Develop science education policies and practices that recognize diverse needs through comprehensive gender analyses.
2. **Multi-modal & Reflective Assessment** – Replace rigid grading with assessments that capture diverse learning styles, boosting motivation and engagement, especially among girls.
3. **Holistic Learning Experience** – Reduce compulsory schooling and rigid grading to make way for a more learner-centred and holistic educational experience.
4. **Flexible Learning Pathways** – Provide diverse alternatives to traditional schooling, such as community centres and apprenticeships, to accommodate varied learning styles and promote the educational continuum.
5. **Integration of Arts & Citizen Science** – Incorporate artistic and citizen science activities in STEAM to foster empathy, creativity, and resilience.
6. **Future-Oriented Curricula** – Support the emotional and empathetic engagement of students in learning by implementing curricula centred on awareness, action and advocacy in STEAM.

EVIDENCE AND ANALYSIS

The SENSE. project envisions a praxis-informed STEAM education model that is inclusive, adaptable, and supportive of a resilient, diverse society prepared to tackle Europe's future challenges. Our mission is to rigorously develop educational alternatives that enhance science education in both learner experience and outcomes, with a particular focus on social creativity and gender inclusion.

Amid global instability, democratic challenges, rapid technological change and sustainability imperatives, future-ready STEAM education must confront a broad spectrum of issues. These include anti-gender rhetoric, misinformation, the integration of large migrant populations, and the transition to a more sustainable economy and lifestyle.

Science education is pivotal for success across multiple dimensions. Europe requires a scientifically literate society to enhance public understanding of the Green Deal, digitization and health, to nurture resilience against disinformation, and strengthen the democratic society. Furthermore, a skilled workforce is critical for navigating the just transition towards a more sustainable and equitable economy.

The SENSE. project is dedicated to fostering an inclusive society where every individual can reach their potential, regardless of gender, age, origin, social background, physical or mental abilities. Despite advancements, gender stereotypes and socioeconomic barriers still hinder career and life opportunities for many. Addressing these issues is crucial, and the EU has long been committed to promoting a more inclusive society, recognizing the associated economic and social benefits from greater equity.

Our vision is rooted in the belief that an inclusive and creative approach to STEAM enriches scientific literacy, enhances work readiness, and increases workforce participation and diversity. By emphasizing social creativity, we embrace diverse perspectives that drive visionary thinking and holistic solutions, benefiting not only research and innovation but society as a whole.

STATUS QUO

Gender stereotypes remain deeply embedded in European society, driving inequality. Nearly half (44%) of Europeans believe a woman's primary role is to care for her home and family. These stereotypes restrict both women and men to make authentic choices and enjoy equal opportunities in society. On average, women in

the EU earn 36% less than men, and spend three times as much time on care work.¹

In education, women have achieved near-parity in degree attainment up to the PhD level. Yet, in leadership roles and STEM fields, they remain severely underrepresented. According to the EU's "She Figures"², a publication by the EC (2021) on gender in education and innovation, women only represent one fifth (20,8%) of students in ICT and a little over one fourth (27%) in Engineering & Engineering trades. Women hold only 23,6% of heads of institutions in the higher education and 24,5% of board positions. This disparity extends into innovation. Women make up just one in ten inventors in Europe, with fewer publications than men, perpetuating a cycle of underrepresentation and limited funding.

Schools reinforce stereotypes through language, a lack of female role models in 'male' professions, and gender imbalances in staffing-- where most teachers are women, but most decision-makers are men. Despite some progress, textbooks often still promote traditional roles. Social inclusion remains a challenge throughout the EU. Current education policies and practices frequently fail to provide students with even basic skills, with a particularly negative impact on groups in socially disadvantaged positions, such as Roma people and individuals with a migration background.³

In Europe, educational segregation based on socioeconomic, ethnic, and regional lines continues to be a significant barrier to social inclusivity, affecting STEM access and limiting broader social mobility. For instance, the Council of Europe reported in 2023 that segregation practices persist concentrating students in disadvantaged situations- especially in under-resourced schools. This directly impacts these students' academic performance and future opportunities. Educational segregation tends to be more prevalent in urban areas with high levels of poverty, leading to unequal educational experiences and a pronounced "achievement gap" in science and technology fields.⁴

EU data highlights persistent disparities in STEAM engagement among disadvantaged communities. Barriers like accessibility and motivation – often linked to socio-economic status, gender, and minority background – persist. In 2023, over 21% of EU residents were at risk of poverty or social exclusion, equating to 94.6 million people with limited access to quality education and STEAM resources. These barriers are particularly pronounced among young adults (18–24), where 26% face economic constraints limiting educational access⁵.

The OECD Programme for International Student Assessment (PISA) measures competences in basic skills (mathematics, reading and science) of 15-year-olds across the world. The most recent (2022 report) data show that, compared to 2018 PISA results, the rate of underachievement has largely increased in mathematics and reading and increased moderately in science. Nearly 30% of EU students do not reach a minimum proficiency level in mathematics, with around 25% underperforming in reading and science. Almost 50% of all students from a disadvantaged background are underachieving in mathematics. School closures and other lockdown measures during the COVID-19 pandemic have further exacerbated inequality and underperformance of disadvantaged groups, as these policies have particularly impeded access to high quality STEAM education for disadvantaged groups.⁶

¹ European Union #End Gender Stereotypes https://end-gender-stereotypes.campaign.europa.eu/index_en (retrieved October 2024)

² European Commission: Directorate-General for Research and Innovation, She figures 2021 – Tracking progress on the path towards gender equality in research and innovation, Publications Office, 2021, <https://data.europa.eu/doi/10.2777/602295>

³ Brending R., 2023, Scoping report on social inclusion and gender in STEAM, Deliverable 6.1 SENSE.STEAM <https://sense-steam.eu/wp-content/uploads/2024/03/D6.1-Scoping-report-on-social-inclusion-and-gender-in-STEAM-v1.0-2.pdf>

⁴ Council of Europe Commissioner for Human Rights, 2017; Fighting school segregation in Europe through inclusive education; <https://school-education.ec.europa.eu/en/discover/publications/fighting-school-segregation-europe-through-inclusive-education>

⁵ Directorate-General for Research and Innovation (2022), Towards a manifesto for gender-inclusive STE(A)M education and careers; https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/towards-manifesto-gender-inclusive-steam-education-and-careers-2022-10-17_en

⁶ European Commission (2024), Report of PISA 2022 study outlines worsening educational performance and deeper inequality <https://education.ec.europa.eu/nl/news/report-of-pisa-2022-study-outlines-worsening-educational-performance-and-deeper-inequality#%3A~%3Atext%3DSome%20key%20figures%3A%2Cbackground%20are%20underachieving%20in%20mathematics>

The situation described above is widely recognized. For over 24 years, EU policies, initiatives, and actions have aimed to address various aspects of gender and social inclusion. Despite these efforts, these barriers persist, indicating an urgent need to re-evaluate and strengthen strategies to foster true inclusivity in STEAM education.

CURRENT EU POLICIES

UNESCO's Recommendations on Inclusive Education

The Education 2030 Agenda (Sustainable Development Goal 4)⁷ aims to ensure inclusive and equitable quality and responsive education that promotes lifelong learning for all. UNESCO's Guide for Ensuring Inclusion and Equity in Education (2017) provides practical guidance on creating inclusive policies, adaptive curricula and supportive learning environments for diverse needs.⁸ The Futures of Education Report (2021) advocates pedagogies that focus on cooperation and collaboration and curricula that emphasise ecological, intercultural and interdisciplinary learning, as well as equitable access to digital technologies for all students.⁹

OECD's Recommendations on Inclusive Education

The OECD Project on Strength through Diversity: Education for Inclusive Societies recognizes that classrooms, schools and society become increasingly "diverse along a variety of dimensions, including migration; ethnic groups, national minorities and Indigenous peoples; gender; gender identity and sexual orientation; special education needs; and giftedness. To navigate this diversity, adopting multiple perspectives could help education systems promote equity and inclusion in education and foster the well-being and learning of all students."¹⁰

The European Education Area (EEA)

The EEA aims to create a common European space where high-quality education and training are accessible to all. Core principles of social inclusion and gender equality should ensure that that education systems are equitable and inclusive, accessible to all students regardless of their background. It also aims to support initiatives to reduce educational disparities and combat discrimination and encourages member states to implement policies that support inclusive education at all levels.¹¹

The Digital Education Action Plan¹² is part of the European Education Area and outlines the EU's strategy for enhancing digital literacy and inclusive digital education across Europe. It aims to ensure that all learners, including those from disadvantaged backgrounds, have access to digital tools and resources, emphasizes the need for teacher training in inclusive pedagogy and encourages initiatives that address the digital divide. Action 13 specifically targets increasing women's participation in STEM studies and careers, ensuring their inclusion in the digital economy. Specific actions, such as the ESTEAM Fest¹³ are implemented with partner organizations to promote gender diversity in digital fields.

The European Pillar of Social rights outline 20 key principles to support fair and effective labour markets and welfare systems, emphasizing social inclusion. Its first principle asserts that Education, training, and lifelong learning must be inclusive and accessible to everyone, providing equal opportunities, combatting social exclusion and supporting policies that address the specific needs of vulnerable and marginalized groups.¹⁴

Under the European Pillar of Social Rights, the Council recommendation on Common Values, Inclusive Education and the European Dimension of Teaching provides guidance to EU member states on fostering

⁷ <https://sdgs.un.org/goals/goal4>

⁸ UNESCO (2017), A guide for ensuring inclusion and equity in education; https://unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196&id=p::usmarcdef_0000248254&file=/in/rest/annotation/VC/DownloadWatermarkedAttachment/attach_import_c2277483-1124-428a-9cc4-222792f56dd1%3F_%3D248254eng.pdf&locale=en&multi=true&ark=/ark:/48223/pf0000248254/PDF/248254eng.pdf#305_17%20Ensuring%20Inclusion_int_21_28_en.indd%3A.178919%3A668

⁹ UNESCO (2021) Reimagining our futures together: A new social contract for education. www.guninetwork.org/wp-content/uploads/2023/09/379707eng-1.pdf

¹⁰ Cerna, L., et al. (2021), "Promoting inclusive education for diverse societies: A conceptual framework", OECD Education Working Papers, No. 260, OECD Publishing, Paris, <https://doi.org/10.1787/94ab68c6-en>.

¹¹ <https://education.ec.europa.eu/>

¹² European Union (2021) <https://education.ec.europa.eu/focus-topics/digital-education/action-plan>

¹³ European Innovation Council and SMEs Executive Agency (2022), Empowering women and girls through digital and entrepreneurial competences with ESTEAM Fests and Communities https://eismea.ec.europa.eu/news/empowering-women-and-girls-through-digital-and-entrepreneurial-competences-esteam-fests-and-2022-03-07_en

¹⁴ European Commission (2017) European Pillar of Social Rights - Building a fairer and more inclusive European Union, <https://ec.europa.eu/social/main.jsp?catId=1226&langId=en>

inclusive education systems that reflect European values. It encourages the integration of social inclusion principles into national education policies, through teacher training and measures to support the inclusion of disadvantaged and marginalized groups in mainstream education.¹⁵

European Research Area (ERA) is another initiative by the European Commission, and its framework includes a specific focus on gender equality and gender mainstreaming in research and innovation, aiming to remove barriers to women's careers and ensure gender balance in decision-making processes.¹⁶

Horizon Europe is the EU's key funding program for research and innovation, which prioritizes gender equality and strives to increase the participation of women in research and innovation projects, particularly in STEM fields. It includes a gender equality requirement for organizations applying for funding.¹⁷

These initiatives illustrate the EU's substantial commitment to fostering a more inclusive and gender-just society. Yet, the persistent gaps demand a critical review of past efforts to identify obstacles. The SENSE.STEAM project directly addresses these challenges within traditional STEM education frameworks, offering an innovative approach to increase equity and inclusion.

POLICY ANALYSIS

The SENSE. project adopts a distinctive methodology, characterized by its transdisciplinary nature, addressing the continuum of knowledge perspectives, promoting holistic education and fostering futuristic practices. The four main features of the methodology include:

1. **Learner Centred pedagogy:** a radical shift from viewing learners as knowledge receivers to active creators of their own knowledge, promoting self-directed learning and empathy with others.
2. **Reflective Feedback:** "Feedback" drives development and transformation by prompting individuals to assess their emotions, thoughts, actions, and impact, fostering ongoing processes. Reflective feedback covers introspection and interaction, enhancing personal encounters, empathy and engagement. This connection expands to humans and non-humans (such as feedback provided through interaction with an object), nurturing a holistic perspective of being in the world.
3. **STEAM inquiry:** In STEAM inquiry various elements of knowing and sense making converge; embodying experiences, probing questions, recognizing patterns, forging connections, showcasing empathy, embracing uncertainty, shaping significance, acting, introspective reflection, and critical assessment. This framework finds application not only within the arts but also in the realm of STEAM research.
4. **Citizen Science and Art practices:** enabling school students to liaise directly with the public, as both science makers and science users. An Art-based Citizen science approach will facilitate engagement with both scientists and artists, artistic interventions, theatres and science labs to explore, discuss and reflect together on matters that are important to the community.

SENSE. transcends traditional assessment, applying multi-modal, co-evaluation methods to enrich student development, engage different learning styles, and promote inclusivity. The project uses a variety of formats that engage the full range of the senses, including drawing and collage, and sensory engagement with smell and sound. It thus caters for different learning styles, promoting a deeper understanding of the subject matter, as well as creating a holistic sense of belonging and promoting meaning making. Co-evaluation involves peer and teacher peer assessment, collaboration, critical thinking and self-reflection. These innovative approaches provide meaningful feedback and support personalised learning journeys, shifting the focus from rote memorisation to a more holistic educational experience.

The SENSE. project developed multiple inclusion strategies and a gender inclusion perspective to ensure full participation of groups in a disadvantaged position (for example migrants, socio-economic deprived, ethnic minorities, sexual minorities and women and girls) and simultaneously values and acknowledges local knowledge and perspectives. The SENSE. approach includes a needs assessment which prioritizes understanding the physical, social and intellectual needs of learners to ensure a needs-based approach and co-create the learning sequences.

¹⁵ European Commission (2018) COUNCIL RECOMMENDATION on promoting common values, inclusive education, and the European dimension of teaching (2018/C 195/01)

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018H0607%2801%29>

¹⁶ https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/european-research-area_en

¹⁷ https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en

The SENSE.STEAM methodology was applied to 13 STEAM LABs throughout Europe and was thoroughly evaluated. The analysis of the sequences finds for all settings and all students high learner engagement, wellbeing, and activation of the senses and low boredom, which are factors known for their relevance for learning outcomes. This success contrasts sharply with traditional schooling, which often demotivates students –especially women and girls – from STEM careers. SENSE.’s learner-centered approach sustained interest in STEM topics, emphasizing the projects potential for enhancing science education.

In pursuit of the overall goal to improve science education and increase the uptake in science careers, the table below summarizes lessons learned from the SENSE. project in the identified barriers mentioned in the ‘status quo’ section for an inclusive and future-proof science education.

“SENSE advocates for a radical shift from viewing learners as knowledge receivers to active creators of their own knowledge.”



Barrier / Challenge	Recommendations	SENSE approach
Accessibility – ensuring participation throughout all levels of society in STEAM activities through needs-based citizens science and art infusion		
Physical, cultural, emotional or academic exclusion of certain groups (e.g. rural, economic deprived, sexual minorities) to certain types of learning opportunities.	Conduct accessibility research on specific physical, cultural and intellectual needs of diverse groups, and allocate adequate funding and resources, to disadvantaged communities.	The SENSE. Needs Assessment includes academic, physical and emotional needs. In some cases, meals and transport were provided for participants from rural areas. Space adaptations were made to increase intellectual and emotional wellbeing.
Low performance and participation in STE(A)M activities by communities in disadvantaged situations.	Adopt innovative assessment methods that measure well-being, engagement, and both long- and short-term learning outcomes, replacing outdated, one-dimensional evaluations that segregate and demotivate students in STEM. Prioritizing well-being fosters supportive, enriching learning environments; sustaining interest boosts engagement and depth of learning; reducing boredom is essential to prevent dropout and maintain motivation.	Evaluation involved sensory body self-portraits to capture emotional and sensory engagement, while surveys assessed participants’ engagement, wellbeing, interest and boredom. This robust framework shapes and refines SENSE. activities, ensuring they are impactful and resonant. Our holistic approach fosters meaningful educational experiences that truly engage learners.
Low interest in STEM subjects among youth, with an insufficient proportion of girls choosing STEM careers.	By promoting multiple learning pathways , personalised and flexible educational experiences can be provided that meet the individual needs of each learner and encourage learners to maintain an interest in STEM subjects.	13 LABs have been established through the SENSE network, offering open ended learning through engaging and diverse activities. Evaluation showed high engagement, positive emotions, high interest and low boredom across all social groups.

Involving Civil Society in informal, non-formal and formal education can reduce inequalities through enhancing and enriching learning		
Groups in a disadvantaged situation are often difficult to reach through formal, state structures, and consequently are poorly integrated, with school segregation and inequality as a result.	Building partnerships with educational institutions, Civil Society organizations and local communities can play a key role in creating tailored educational programmes that meet specific needs and promote a more inclusive learning environment with an intersectional approach.	Civil Society partners were able to organize STEAM labs with disadvantaged groups from minority communities due to their inside connections, specific knowledge and flexibility. Their integration in the affected communities ensure taking an intersectional perspective throughout the project.
Deeply held stereotypes on gendered behaviour, abilities and social roles are being re-enforced in schools, resulting in biases and inequalities.	Engage with feminist, gender and grassroots organizations to implement actions to debunk stereotypes, explore gender concepts, gender bias, gender roles and empower women, girls and sexual minorities to live to their fullest potential.	SENSE. advocates for adopting a gender-sensitive and intersectional approach that breaks traditional methods/stereotypes through self-reflection, exploration and open-dialogue with the involvement of feminist and grassroots organizations.
Education continuum – refocusing science education from abstract concepts onto real world relationships, and reducing compulsory teaching for learning opportunities lead to inclusion, engagement and women's participation		
High levels of school segregation among groups of different social backgrounds	Promoting lifelong learning initiatives that go beyond the traditional school years and interests of economies and labour markets will encourage inclusion and yield an increasingly science literate society.	The SENSE. project encourages a learner-centered, needs-based perspective. Activities were attended voluntarily and aimed to engage learners of all backgrounds.
Decreasing interest and performance in STEM subjects among vulnerable groups.	Integrate participatory arts and citizen science: - A robust STEAM education methodology as SENSE. provides, implies the systematic integration of the arts and citizen science into STEM and STEAM curricula.	SENSE. aims to increase accessibility through multiple inclusion strategies, using art infusion and citizen science, resulting in high engagement and low boredom.
Existing curricula are no longer sufficient to prepare students and learners to combat current worldwide challenges	Develop new curricula that reach beyond traditional orientations and are learner centred, democratic, non-coercive.	The SENSE. project provides such curricula at three levels: awareness, action and advocacy for STEAM education.

POLICY RECOMMENDATIONS

An inclusive, gender just and fair education system and society are engrained in European policies and strategies. The SENSE.STEAM project demonstrates how conceptual changes in educational approaches can effectively support the highly needed turnaround. To address the critical challenges Europe currently faces, comprehensive reforms in science education are urgently needed. This involves promoting diverse learning pathways while reducing the rigidity of compulsory schooling. Rather than relying solely on traditional school environments, we should embrace alternative learning options such as community centres, maker spaces, online platforms, and apprenticeships. These programs can cater to varied learning styles, backgrounds and adapt to the evolving labour market, ultimately supporting lifelong learning initiatives. SENSE. proposes three approaches to enhance social inclusion and gender justice in science education: Ensuring **accessibility**, **involving civil society** and offering an **education continuum**. Key recommendations include:

Accessibility – ensuring participation throughout all levels of society in STEAM activities through needs-based citizens science and art infusion.

- **Reducing inequalities by getting to know the needs** - Achieving accessible and inclusive science education requires **comprehensive needs assessments and gender analysis** to identify and **dismantle** existing barriers. Research funding is needed to explore the specific physical, emotional, cultural and academic needs of underrepresented groups in science education. In drafting policies about science education, policymakers should recognize that students do not constitute a homogeneous group. Sufficient resources should be allocated to implement policies and actions to meet these diverse needs effectively.
- **Less grading and more reflective feedback** – Rigid, single-focus assessments often hinder inclusion and inadvertently reinforce segregation. SENSE. promotes innovative, multi-dimensional assessments and reflective feedback [as crucial in promoting social and gender inclusion, intrinsic motivation and self-directed learning- especially for women in STEAM fields.
- **Reduce compulsory schooling**: Traditional schooling often stifles creativity and interest in STEAM. By loosening curriculum requirements, and moving beyond conventional schooling, we can better face contemporary and future challenges by creating a more dynamic and adaptable education system that prioritize **self-directed learning, creativity, and diversity of opportunity**.
- **Expand multiple learning options**. Personalized, diverse educational pathways—such as community centers, online platforms, and maker spaces—allow students to thrive in settings tailored to their needs. Policies should encourage and fund these innovative environments to support varied learning styles.

Involving Civil Society in informal, non-formal and formal education can reduce inequalities through enhancing and enriching learning

- **Building partnerships** with educational institutions, civil society organizations and local communities can help to create tailored educational programmes that meet specific needs and promote a more inclusive learning environment. By encouraging collaborative projects between schools, cultural institutions and scientific organisations, we can create diverse, transdisciplinary learning opportunities that enrich programmes across the educational continuum.
- Cooperate with **civils society, feminist and grassroots organizations** to implement actions to debunk stereotypes, explore gender concepts, gender bias, gender roles and empower women, girls and sexual minorities. They can be engaged in developing learning material, lessons, and teacher training to pursue inclusive education with an intersectional and feminist approach.

Education continuum – refocusing science education from abstract concepts onto real world relationships and reducing compulsory teaching for learning opportunities lead to inclusion, engagement and women's participation.

- **Promoting lifelong learning initiatives** that go beyond the traditional school years and traditional school subject will encourage inclusion and yield an increasingly science literate society. Educational reforms should maintain high standards while providing the necessary flexibility for both educators and learners to benefit from different pedagogical approaches.
- **Integrate participatory arts and citizen science**: A robust STEAM education such as SENSE. implies the systematic integration of the arts and citizen science into STEM and STEAM curricula. SENSE. blends scientific inquiry with artistic exploration to create a new form of inquiry that allows for the coexistence of answers and solutions to a question or problem, enhances creativity and systems thinking, and recognises that every learner is emotionally attached to their learning process and empathetic to the world around them. Highlighting the value of participatory arts and citizen science in developing essential skills such as empathy, communication and sensemaking will prepare learners for the challenges of the future.
- There is an urgent need for **new curricula beyond traditional orientations** that prepare students of all backgrounds to face upcoming challenges. Instead of focusing solely on measurable competences and declarative knowledge, we need future-oriented curricula that dare to face the unknown and prepare learners for emerging complexities. These curricula should be designed to foster critical thinking, creativity and adaptability, empowering students to engage meaningfully with the world and innovate for the future. It is essential to ensure continuous feedback and adaptation of these curricula to reflect the evolving needs of society and the environment. By implementing these forward-looking

curricula within a variety of settings, we can build a more resilient, inclusive and innovative educational framework

PROJECT IDENTITY

PROJECT NAME	SENSE. The New European Roadmap to STEAM Education [SENSE.]
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