

Survey report

Erasmus+ Programme
EnterSTEAM -
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As part of the Erasmus+ funded EnterSTEAM project, we are researching the key characteristics and best practices of teaching STEAM—Science, Technology, Engineering, Arts, and Mathematics—across Europe. The project aims to support innovation in education and better prepare students for a changing world. One of its main goals is to create a methodological guide and a digital toolkit to help teachers apply STEAM in their classrooms more confidently and effectively.

In December 2024, a survey was conducted in six European countries: Austria, Hungary, Italy, Latvia, Romania, and Türkiye. The survey assessed the awareness and application of the STEAM approach among educators and explored their perceptions of its impact—particularly in developing students' entrepreneurial skills, creativity, and inclusive attitudes. Teachers from various educational levels and school types responded, providing a diverse and valuable picture of how STEAM is being understood and used across Europe.

Results per partner country

ROMANIA

Introduction

This report presents the findings of the survey conducted among Romanian educators representing general education, VET and non-formal education sectors.

The purpose of the survey was to explore educators' knowledge of the STEAM approach, identify main challenges in its implementation, and understand its connections with creativity, entrepreneurship and inclusive education.

A total of **20 responses** were collected, providing a clear picture of the current situation in Romania regarding the understanding and application of the STEAM approach.

Findings – Romania

1. Knowledge of STEAM

- Overall rating: most respondents (35%) assessed their knowledge with 3 on a scale from 0 to 5, 5 being excellent. Another 30% rated it with 4 and 15% with 5, while 5% chose 0, 10% 1 and 5% 2.
- Range of responses: 0 to 5.

Interpretation

These results indicate moderate to good familiarity with the STEAM approach among Romanian educators. While a small share declared very low or no knowledge, the majority report medium to advanced understanding, which creates an opportunity to deepen and systematise **training**.

2. STEAM focus areas

Participants were asked to identify which STEAM fields they primarily focus on. The answers show a balanced emphasis on arts and technology, but other fields are also represented.

- Art – 25% of respondents

- Technology – 25%
- Science – 15%
- Mathematics – 10%
- Engineering – 10%
- No specific field chosen -15

Interpretation

The distribution demonstrates that both artistic and technical disciplines are actively involved in the STEAM approach in Romania. This suggests good potential for interdisciplinary work, combining creativity with scientific and technological **competences**.

3. Importance of Arts in STEAM

Participants were asked about the role of arts integration in STEAM education.

- Very important – 65%
- Somewhat important – 35%
- Not at all important – 0%.

Interpretation

The majority of respondents view arts as highly important within STEAM, with the rest still recognising them as somewhat important. This confirms arts as a key element for making learning more engaging and for connecting analytical skills with creativity and **flexibility**.

4. Key Challenges in STEAM implementation

Several barriers (multiple answers possible) to effective STEAM education were identified.

Main challenges:

- Lack of resources – very frequent mention
- Insufficient training – very frequent mention
- Lack of time – very frequent mention
- Curriculum constraints – mentioned by some respondents
- Other context-related difficulties (e.g. limited interest, technical barriers, institutional aspects).

Interpretation

Romanian educators underline structural barriers similar to those in other countries: lack of material and financial resources, limited time and insufficient training. These findings show the need for accessible training offers, practical materials and organisational adjustments to fully support the **implementation** of STEAM.

5. Influence of Arts on engagement and creativity

When asked about the impact of arts integration in STEAM education, respondents agreed that it enhances student engagement and creativity.

- Significantly increases engagement and creativity – 50%
- Somewhat increases engagement and creativity – 50%
- Decreases engagement and creativity – 0%.

Interpretation

The results show a unanimously positive perception of arts within STEAM. Educators believe that artistic elements help students participate more actively, experiment and express ideas more freely, which strengthens their overall **motivation** to learn STEAM subjects.

6. Impact of STEAM on other subjects

Respondents assessed how STEAM education improves competencies in other academic fields such as psychology, languages and history (scale 0–4).

- Rating 2 – 30%
- Rating 3 – 35%
- Rating 4 – 35%

Interpretation

Most respondents attribute a medium to high impact of STEAM on non-STEAM subjects. This indicates that they see STEAM as a transversal approach, helping develop critical thinking, communication and problem-solving skills that can be transferred to humanities and social **sciences**.

7. Connection between STEAM and entrepreneurship

Participants rated how well STEAM is related to entrepreneurship skills (1–5, 5 = excellent).

- 1 – 5%
- 2 – 5%
- 3 – 15%
- 4 – 45%
- 5 – 30%.

A large majority (75%) see the connection between STEAM and entrepreneurship as strong (ratings 4 and 5). This confirms that educators consider STEAM a relevant framework to develop entrepreneurial attitudes such as initiative, innovation and opportunity **recognition** in students.

8. STEAM and creativity

Respondents rated how well STEAM is related to creativity (1–5).

- 2 – 5%
- 3 – 10%
- 4 – 40%

- 5 – 45%.

Interpretation

Almost all respondents placed the link between STEAM and creativity at the higher end of the scale. This demonstrates a strong belief that STEAM fosters creative thinking, experimentation and original problem-solving, which are seen as essential **outcomes** of education.

9. STEAM and inclusive education

According to the survey, the STEAM approach is also associated with inclusive education (1–5).

- 2 – 10%
- 3 – 20%
- 4 – 30%
- 5 – 40%.

Interpretation

Most Romanian respondents consider STEAM relevant or very relevant for inclusive education. They believe that hands-on, creative and interdisciplinary activities can support diverse learners and offer more equal learning **opportunities**.

STEAM in Practice – Resources, Institutional Support, Challenges

10. Resources needed for better STEAM integration

Participants indicated which resources they need to better integrate STEAM (multiple answers).

- Funding – 75%
- Training workshops – 70%
- Collaborative opportunities – 70%
- Learning materials – 55%.

Interpretation

There is a strong call for financial support (funding) to buy materials and equipment, alongside structured training and collaboration opportunities. Educators also emphasise the need for ready-to-use learning materials that can help them plan and implement STEAM **activities** more easily.

11. Institutional Approaches to Supporting Diverse Learners in STEAM

Respondents selected which forms of institutional support are used or needed to address diverse learners in STEAM contexts (multiple answers).

- Use of assistive technologies – 65%
- Differentiated instruction – 40%
- Flexible curriculum – 40%

- Additional support staff – 25%
- Other (please specify) – 5%.

Interpretation

The answers highlight the importance of digital and technical tools, differentiated methods and curriculum flexibility to adapt STEAM to different needs. Additional support staff and other tailored measures are also seen as important to ensure that all learners can **participate**.

Equity and Entrepreneurship in STEAM

13. STEAM and equity in learning opportunities

When asked whether STEAM supports equal learning opportunities, respondents stated:

- Strongly agree – 30%
- Agree – 45%
- Neutral – 25%.

Interpretation

Most educators agree or strongly agree that STEAM contributes to equity in learning. This suggests that they view STEAM as a way to offer varied entry points into learning, helping students with different strengths and backgrounds engage with **content**.

14. Impact of STEAM on entrepreneurial skill development

On a scale from 1 to 5, 5 being excellent, respondents evaluated how STEAM influences entrepreneurial skills.

- 2 – 5%
- 3 – 25%
- 4 – 40%
- 5 – 30%.

Interpretation

A combined 70% of respondents chose 4 or 5, meaning they perceive a strong or very strong impact of STEAM on entrepreneurial skills. STEAM is thus recognised as a method that can foster initiative, risk-taking and practical problem-solving useful in **entrepreneurship**.

15. Essential Skills for STEAM entrepreneurs

Participants identified the most critical entrepreneurial skills in a STEAM context (multiple answers).

- Creativity – 85%
- Collaboration – 85%
- Technical skills – 85%
- Problem-solving – 75%

- Communication – 65%
- Inclusive attitude – 60%.

Interpretation

The ranking shows that Romanian educators value a combination of technical and soft skills for future STEAM entrepreneurs. Creativity, collaboration and solid technical knowledge, together with problem-solving, communication and an inclusive attitude, form a comprehensive **profile** of desired competences.

Self-Assessment and Personal Development in STEAM

16. Participation in STEAM Training

Respondents were asked whether they had previously taken STEAM training.

- No – 85%
- Yes – 15%.

Interpretation

The vast majority have not yet participated in STEAM-specific training, showing a substantial training gap but also strong potential for impact of the EnterSTEAM project. The relatively small group with training experience can serve as initial **multipliers** in their institutions.

17. Self-Assessment of creativity

(This question in the Romanian form is captured through a series of Likert-type items on creativity and related attitudes rather than a single 1–5 rating, so the interpretation is aligned but not identical to the Latvian format.)

Respondents generally describe themselves as creative and report that new ideas come to mind frequently, that they are not afraid of challenges and that they feel good at problem-solving. Many also express curiosity about technical aspects of things around them and confidence in choosing appropriate methods, which supports the integration of **STEAM** in their work.

18–23. Personal perceptions on creativity, Problem-Solving and Innovation

The survey explored several personal attitudes using statements such as: “Generally, I consider myself a creative person”, “In general, new ideas come to my mind”, “I am not afraid of challenges”, “Context-based methods increase my productivity”, “I find myself good at problem solving”, “I am curious about the technical aspects of things around me” and “I can adequately choose necessary methods”.

Across these items, most respondents chose “Agree” or “Strongly agree”, indicating a strong inclination toward creative and analytical thinking as well as openness to innovation. This mindset provides a favourable basis for adopting STEAM approaches, as educators feel confident in experimenting, solving problems and integrating technical aspects into their **teaching** practice.

Below is a conclusion section aligned with the style of the Latvian report and consistent with the Romanian data you used.

Conclusion

1. Romanian educators report overall moderate to high knowledge of STEAM, with most respondents placing themselves at levels 3–5, which indicates a good starting point but also a need to support those who still report low familiarity.
2. Arts and Technology emerge as the most frequent focus areas, while Science, Mathematics and Engineering are also represented, confirming that STEAM is perceived as a flexible framework that connects creative and technical disciplines in Romanian education.
3. The integration of Arts in STEAM is seen as very important by the majority of respondents and is unanimously perceived as increasing student engagement and creativity, highlighting arts as a central element for motivating and activating learners.
4. The survey reveals significant barriers to STEAM implementation, especially limited resources, lack of training and lack of time, together with curriculum constraints, which point to the need for funding, practical materials, professional development and institutional support measures.
5. STEAM is strongly associated with entrepreneurship, creativity and inclusive education, with respondents recognising its positive impact on entrepreneurial skills, transversal competences in other subjects and equal learning opportunities for diverse learners.
6. Although most respondents have not yet attended STEAM-specific training, they describe themselves as creative, open to challenges and confident in problem-solving and technical curiosity, suggesting a favourable personal mindset for future STEAM-based training activities and materials developed within EnterSTEAM.

AUSTRIA

Introduction

This report presents the findings of a survey conducted among Austrian **VET experts** and **digital methodology professionals** in **secondary and higher education**. The purpose of the survey was to **assess perceptions, experiences, and challenges** related to **STEAM (Science, Technology, Engineering, Arts, and Mathematics) education**.

A total of **27 participants** took part, providing valuable insights into their **knowledge levels, focus areas, and opinions** on STEAM education.

Findings

1. Knowledge of STEAM

- **Average rating:** 2.93 (on a scale from 0 to 5)
- **Range of responses:** 0 to 5
- **Interpretation:** Indicates **moderate familiarity** with the STEAM approach. While some respondents reported **little or no knowledge**, a **significant portion** rated their knowledge as at least **basic to advanced**, suggesting room for further **training and development**.

2. STEAM Focus Areas

Participants were asked to identify which STEAM fields they primarily focus on, revealing a strong emphasis on arts:

- Art: 11 respondents
- Science: 6 respondents
- Mathematics: 6 respondents
- Engineering: 2 respondents
- No specific focus: 1 respondent
- Technology: 1 respondent

The results suggest that STEAM implementation in Austria often integrates arts, while engineering and technology receive comparatively less attention.

3. Importance of Arts in STEAM

Participants were asked about the role of **arts integration** in STEAM education:

- **Very important:** 19 respondents
- **Somewhat important:** 8 respondents

The **majority of participants** (19 out of 27) rated the **integration of arts in STEAM as very important**, while **8 respondents** considered it **somewhat important**. This confirms that arts are perceived as a **critical component of STEAM education**, particularly in fostering **creativity and engagement** among students.

4. Key Challenges in STEAM Implementation

Several **barriers to effective STEAM education** were identified, with **three main challenges standing out**:

- **Insufficient training opportunities** (15 mentions)
- **Lack of resources** (13 mentions)
- **Time constraints** (12 mentions)

Additionally, **curriculum constraints** (8 mentions) were seen as another limiting factor. The findings suggest a **pressing need for professional development, improved resource allocation, and curriculum adjustments** to support effective STEAM integration.

5. Influence of Arts on Engagement and Creativity

When asked about the impact of **arts integration in STEAM education**, most respondents **agreed it enhances student engagement and creativity**:

- **Significantly increases engagement and creativity:** 17 respondents
- **Somewhat increases engagement and creativity:** 9 respondents
- **Decreases engagement and creativity:** 1 respondent

These results indicate that **arts contribute positively to the overall learning experience**, reinforcing the importance of interdisciplinary approaches within STEAM.

6. Impact of STEAM on Other Subjects

Respondents assessed how **STEAM education improves competencies in other academic fields**, such as **psychology, languages, and history**.

- Average impact rating: 3.48 (on a scale from 1 to 5)
- Range of responses: 0 to 5

The results suggest that STEAM contributes to the development of cross-disciplinary skills, with moderate positive effects on other subjects.

7. Connection Between STEAM and Entrepreneurship

The perceived relevance of STEAM for **entrepreneurial skills** received a strong average **rating of 4.04** on a 1-to-5 scale, reinforcing the connection between STEAM education and business innovation.

8. STEAM and Creativity

Respondents rated **the link between STEAM and creativity highly**, with an **average rating of 4.11 (out of 5)**. This underscores the **role of STEAM in fostering problem-solving, innovation, and creative thinking skills**.

9. STEAM and Inclusive Education

STEAM was also seen as beneficial for **inclusive education**, receiving an **average rating of 4.0**, indicating **strong support for its role in creating equitable learning opportunities**.

STEAM in Practice: Resources, Institutional Support & Challenges

10. Resources Needed for Better STEAM Integration

- **Training workshops**: 22 mentions
- **Learning materials**: 18 mentions
- **Collaborative opportunities**: 14 mentions
- **Funding**: 9 mentions

This highlights the **need for professional training, accessible teaching resources, and collaboration** among educators to **enhance STEAM effectiveness**.

11. Institutional Approaches to Supporting Diverse Learners in STEAM

Institutions employ various strategies to support diverse learners within the STEAM framework:

- **Differentiated instruction:** 14 mentions
- **Use of assistive technologies:** 14 mentions
- **Flexible curriculum:** 15 mentions
- **Additional support staff:** 9 mentions

12. Challenges in Creating an Inclusive STEAM Learning Environment

Despite institutional efforts, several barriers persist:

- **Lack of training:** 14 mentions
- **Limited resources:** 20 mentions
- **Institutional policies:** 7 mentions
- **Student resistance:** 8 mentions

These findings reinforce the need for **strategic policy changes, better funding, and educator training** to promote **inclusive STEAM education**.

Equity and Entrepreneurship in STEAM

13. STEAM and Equity in Learning Opportunities

When asked whether STEAM supports equal learning opportunities, respondents stated:

- **"Agree":** 12 respondents
- **"Strongly Agree":** 12 respondents
- **"Neutral":** 3 respondents

14. Impact of STEAM on Entrepreneurial Skill Development

- **Average rating:** 4.2 (on a scale from 0 to 5)
- **Range of responses:** 0 to 5

15. Essential Skills for STEAM Entrepreneurs

Participants identified the **most critical entrepreneurial skills in a STEAM context**:

- **Problem-solving:** 24 mentions
- **Creativity:** 21 mentions
- **Communication:** 21 mentions
- **Collaboration:** 17 mentions
- **Technical skills:** 17 mentions
- **Inclusive attitude:** 9 mentions

- **Flexibility and adaptability:** 1 mention
- **Self-confidence and resilience:** 1 mention

Self-Assessment and Personal Development in STEAM

16. Participation in STEAM Training

- **Yes:** 22 respondents
- **No:** 5 respondents

17. Self-Assessment of Creativity

- **Average rating:** 4.2 (on a scale from 0 to 5)
- **Range of responses:** 0 to 5

18-23: Personal Perceptions on Creativity, Problem-Solving & Innovation

The survey also explored personal attitudes toward creativity, problem-solving, and innovation, with strong positive responses:

- Ability to generate new ideas: 20 respondents agreed or strongly agreed
- Confidence in problem-solving: 24 respondents agreed or strongly agreed
- Interest in technical aspects: 19 respondents agreed or strongly agreed

These responses reflect a strong inclination toward creative and analytical thinking, critical components of STEAM education.

Conclusion

1. **Moderate STEAM Knowledge:** While there is **basic awareness**, there is a **need for further training**.
2. **Arts as a Core Component:** The **integration of arts in STEAM** is **highly valued**.
3. **Challenges Persist:** **Lack of training, resources, and time constraints** are **major obstacles**.
4. **Entrepreneurial Relevance:** STEAM is **strongly connected** to **creativity, entrepreneurship, and inclusivity**.
5. **Training & Resources Needed:** **Workshops, funding, and better collaboration** are **key for STEAM implementation**.

The findings confirm that **STEAM education fosters creativity, innovation, and entrepreneurship**, but **more institutional support is required to overcome existing barriers**.

Introduction

As part of the Erasmus+ funded "EnterSTEAM" project, we are researching the key characteristics and best practices of teaching STEAM (Science - Technology - Engineering - Arts - Mathematics) across Europe. The project aims to create a methodological guide and a digital toolkit for educators.

In December 2024, a survey was conducted at the Ganz Ábrahám Bilingual Technical School. The survey assessed the awareness and application of the STEAM approach, which integrates the teaching of science, technology, engineering, arts, and mathematics, among the school's teaching staff. Additionally, it aimed to explore how educators perceive the impact of the STEAM methodology on developing students' entrepreneurial skills, creativity, and inclusive attitudes.

Participation in the survey was voluntary. Personal data was handled confidentially and used exclusively for the project's purposes in aggregated form. The results of the survey are presented below.

Background of Participants

The Ganz Ábrahám Bilingual Technical School employs 40 full-time and part-time educators, supported by an additional 8 visiting lecturers. Out of these, 29 staff members completed the survey, representing 72.5% of the staff.

The school has a high proportion of educators over the age of 45. More than two-thirds of the teaching staff are over 45, and over one-third are above 55. This trend is not unique to Ganz Ábrahám; similar demographics are observed in other Hungarian schools. Educators aged 35-45 are the least represented, though the increasing presence of younger teachers in their twenties offers some hope for the future.

This demographic trend is reflected in the survey responses, with a higher proportion of respondents aged over 45 and fewer respondents aged 20-35 or 36-45.

The participants teach various subjects. Given that most students specialize in software development and testing, a significant number of respondents teach IT-related subjects, including programming, IT foundations, and software testing. Additionally, teachers of mechanical engineering subjects (e.g., CAD-CAM, CNC programming, and machining) and other subjects such as English, German, history, and physical education also participated.

Self-Assessment of STEAM Methodological Knowledge

Most participants rated their knowledge of STEAM teaching methods as moderate (9 respondents) or good (6 respondents), while one respondent reported excellent knowledge. However, 31% of participants (9 respondents) had not heard of STEAM teaching methods, and an additional 13.8% had only limited familiarity with them.

Importance of Creativity and Creation

The vast majority of respondents emphasized the importance of incorporating creativity and the experience of creation into STEAM-based teaching.

Application of STEAM Methods

Many participants have experimented with elements of STEAM methodology in their teaching practice. A significant number of respondents confirmed the positive effects of integrated, problem-centered teaching, particularly in subjects such as history and foreign languages.

According to respondents, STEAM teaching methods contribute to the development of students' creativity, foster inclusivity, and support integrated teaching approaches.

Additionally, participants believe that STEAM methods significantly enhance students' entrepreneurial skills, creativity, problem-solving abilities, teamwork skills, and technical knowledge.

Required Support

Respondents indicated the need for further training, methodological resources, and opportunities for collaboration to effectively integrate STEAM methods. Several also mentioned the importance of financial support.

Challenges

Challenges in applying the STEAM approach include its initial time-intensive nature, requiring significant preparation and effort from teachers. In contrast, traditional methods are easier to implement with less time and energy.

STEAM methodology demands proficiency in multiple disciplines, which educators may not be prepared for. Inclusive, integrated education involves personalized and differentiated teaching methods, modeling the world at an appropriate level for students without oversimplifying complex concepts.

Teaching students with varying levels of knowledge and skills requires additional preparation, patience, and empathy. Challenges include working with foreign-language learners, managing students with different abilities, and addressing resistance to teamwork or new methods.

Parents may also resist, perceiving new methods as less serious or doubting their effectiveness in preparing students for final exams and other assessments within traditional subject frameworks.

Personal Attributes and Pedagogical Approach

Most respondents consider themselves creative, team-oriented, and skilled problem-solvers. They emphasized that content-based and problem-centered methods enhance teaching effectiveness.

Summary

The survey revealed that while some educators at Ganz Ábrahám Bilingual Technical School are familiar with STEAM teaching methods and have applied them, few feel confident in their implementation.

Teachers require additional training, methodological resources, and opportunities for collaboration to fully integrate these methods into their practice.

According to the majority of respondents, the integrated teaching of science, technology, engineering, arts, and mathematics positively impacts other subjects, fosters an entrepreneurial mindset, and enhances creativity while promoting inclusivity among students.

The results suggest that educators are open to further exploring and adopting the STEAM approach.

ITALY

Introduction

This report summarizes the findings from a survey conducted among Italian VET experts and digital methodologies experts active in secondary and university education to explore perceptions, experiences and challenges related to STEAM (Science, Technology, Engineering, Art and Mathematics) education. A total of 7 respondents participated in Italy, sharing insights on their knowledge, focus areas and opinions.

Findings

1. Knowledge of STEAM Respondents rated their knowledge about STEAM on a scale from 0 (none) to 5 (excellent). The average score was 2.7, with responses ranging from 2 to 4. This indicates a moderate familiarity with the STEAM approach.

2. STEAM Fields Focus Participants were asked which fields within STEAM they focus on. Responses were as follows:

- None: 3 respondents
- Technology: 3 respondents
- Mathematics: 1 respondent

3. Importance of Arts in STEAM When asked about the importance of integrating Arts into STEAM for effective learning:

- 6 respondents considered it "Very important."
- 1 respondent considered it "Somewhat important."

4. Challenges in STEAM Implementation The following challenges were identified:

- Insufficient training: 3 respondents
- Lack of resources and insufficient training: 1 respondent
- Lack of resources, insufficient training, and lack of time: 1 respondent
- Curriculum constraints and lack of collaboration: 1 respondent
- Lack of resources and lack of time: 1 respondent

5. Influence of Arts on Engagement and Creativity On how incorporating Arts into STEAM education influences student engagement and creativity:

- 6 respondents indicated it "Significantly increases engagement and creativity."
- 1 respondent indicated it "Somewhat increases engagement and creativity."

6. Impact on Other Subjects Participants rated the impact of STEAM on improving skills in subjects like psychology, languages, and history on a scale from 1 (low) to 5 (high). The average rating was 2.9, with a range of 1 to 4.

7. STEAM and Entrepreneurship Respondents rated the relevance of STEAM to entrepreneurship skills on a scale of 1 to 5. The average score was 4.3, indicating a strong perceived relationship.

8. STEAM and Creativity The perceived relationship between STEAM and creativity was highly rated, with an average score of 4.4 on a scale of 1 to 5.

9. STEAM and Inclusive Education The relevance of STEAM to inclusive education was rated 3.3 on average, with responses ranging from 2 to 4.

10. Skills for Entrepreneurs in STEAM Context The essential skills identified for success in a STEAM context include:

- Creativity, problem-solving, collaboration, technical skills, and communication (mentioned by multiple respondents).
- Inclusive attitude and problem-setting were also noted as valuable.

11. STEAM Training When asked if they had taken STEAM training before:

- 5 respondents indicated "No."
- 2 respondents indicated "Yes."

Conclusion

The survey highlights moderate familiarity with STEAM methodology among respondents and emphasizes the importance of integrating Arts into STEAM to enhance engagement and creativity of learners. Key challenges include insufficient training, lack of resources and collaboration barriers. Despite these challenges, respondents strongly associate STEAM with creativity and entrepreneurship skills. There is a need for increased training and resource allocation to maximize STEAM's potential in education.

LATVIA

Introduction

This report presents the findings of a survey conducted among Latvian educators (mostly languages) who represent **VET, adult education and general education** institutions. With this survey it was intended to discover their knowledge about STEAM and its application in real-life education, main barriers and possible solutions.

A total of **28 responses were collected**, providing insight of the actual situation in Latvia in regards to STEAM approach and its real-life application.

Findings

1. Knowledge of STEAM

- **Overall rating:** majority (53,6%) assess their knowledge with 3 on a scale from 0 to 5 (5 being excellent). 21,4% marked 4; 5 (17,9%) respondents assessed it as 0, meanwhile 2 respondents (7,1%) assessed it with 2 points.
- **Range of responses:** 0 to 5
- **Interpretation:** Indicates **moderate familiarity** with the STEAM approach. While some respondents reported **little or no knowledge**, a **significant portion** rated their knowledge as **medium to advanced**, thus providing opportunity for further **training and development**.

2. STEAM Focus Areas

Participants were asked to identify which STEAM fields they primarily focus on, revealing a strong emphasis on arts:

- Languages: 11 respondents (39,3%)
- Other field: 8 respondents (28,6%)
- Science: 4 respondents (14,3%)
- Art: 2 respondents (7,1%)
- Technology: 2 respondents (7,1%)
- Mathematics: 1 respondent (3,6%)

The results demonstrate the interest of language and other field educators who are not related to STEAM in STEAM approach, thus suggesting the need and possible transversal skills application in non-STEAM subjects.

3. Importance of Arts in STEAM

Participants were asked about the role of **arts integration** in STEAM education:

- **Very important:** 19 respondents (67,9%)
- **Somewhat important:** 8 respondents (28,6%)
- **Not at all:** 1 respondent (3,6%)

The **majority of participants** (19 out of 27) assessed the **integration of arts in STEAM as highly important**, while **8 respondents** considered it **somewhat important**. This proves art as an important milestone in developing STEAM approach, thus connecting logical and analytical skills with creativity and ability to adjust.

4. Key Challenges in STEAM Implementation

Several **barriers** (several answers were possible) to **effective STEAM education** were identified, with **three main challenges standing out**:

- **Insufficient training opportunities** (17 mentions, 60,7%)
- **Lack of resources** (17 mentions, 60,7%)
- **Lack of time** (16 mentions, 57,1%)

Additionally, **curriculum constraints** (8 mentions) were seen as another limiting factor. The findings prove the need for **adequate training, informative educational materials and curriculum adjustments**.

5. Influence of Arts on Engagement and Creativity

When asked about the impact of **arts integration in STEAM education**, most respondents **agreed it enhances student engagement and creativity**:

- **Significantly increases engagement and creativity**: 15 respondents, 53,6%.
- **Somewhat increases engagement and creativity**: 11 respondents, 39,3%.
- **Decreases engagement and creativity**: 2 respondents, 7,1%.

Overall results demonstrate that **arts would have a positive effect on the overall learning experience**, strengthening engagement in STEAM.

6. Impact of STEAM on Other Subjects

Respondents assessed how **STEAM education improves competencies in other academic fields**, such as **psychology, languages, and history**.

- Overall rating (on a scale from 0 to 4): 13 respondents (64,6%) rated it with 4, 7 respondents (25%) rated with 3, 8 respondents (28,6) rated with 2.
- Range of responses: 0 to 4

According to the respondent feedback, the relation between STEAM and non-STEAM subjects is crucial and impact each other significantly.

7. Connection Between STEAM and Entrepreneurship

16 respondents (57,1%) suggest that STEAM and entrepreneurship skills are strongly related among them, meanwhile 9 respondents (32,1%) consider it to be quite strong impact.

8. STEAM and Creativity

Respondents rated **the link between STEAM and creativity very highly, 24 respondents rated it with 3 or 4 out of 4**. This result demonstrates once again the constant belief in the correlation between creativity and STEAM approach.

9. STEAM and Inclusive Education

According to the survey results, the STEAM approach correlates with inclusive education as follows (rating 0 to 4):

- 7 respondents (25%) highly relevant

- 13 respondents (46,4%) quite relevant
- 6 respondents (21,4%) relevant

Our respondents believe that STEAM education would strongly support inclusion in education and equal learning opportunities.

STEAM in Practice: Resources, Institutional Support & Challenges

10. Resources Needed for Better STEAM Integration (several answers were possible)

- **Training workshops:** 21 respondents (75%)
- **Learning materials:** 21 respondents (75%)
- **Collaborative opportunities:** 15 respondents (53,6%)
- **Funding:** 13 mentions (46,4%)

There is **almost unanimous need for training workshops and learning materials** marked as crucial support for educators, complemented with collaborative opportunities and funding. to **enhance STEAM effectiveness**.

11. Institutional Approaches to Supporting Diverse Learners in STEAM

Educators feel that the following support is the most required to successfully implement STEAM in diverse educational settings:

- **Flexible curriculum:** 12 mentions (42,9%)
- **Use of assistive technologies:** 8 mentions (28,6%)
- **Differentiated instruction:** 7 mentions (25%)
- **Additional support staff:** 6 mentions (21,4%)

These responses mark a significant **need for an adapted curriculum that is suitable for 21st century needs in educational settings**.

Equity and Entrepreneurship in STEAM

13. STEAM and Equity in Learning Opportunities

When asked whether STEAM supports equal learning opportunities, respondents stated:

- **"Strongly agree":** 4 respondents (14%)
- **"Agree":** 13 respondents (46,4%)
- **"Somewhat Agree":** 11 respondents (39,3%)

14. Impact of STEAM on Entrepreneurial Skill Development (on a scale 1-5, 5 being excellent)

- **Rating:**
 - 1 - 1 respondent (3,6%)
 - 2 - 1 respondent (3,6%)
 - 3 - 4 respondents (14,3%)
 - 4 - 15 respondents (53,6%)
 - 5 - 7 respondents (25%)

15. Essential Skills for STEAM Entrepreneurs

Participants identified the **most critical entrepreneurial skills in a STEAM context**:

- **Problem-solving**: 24 mentions (85,7%)
- **Communication**: 21 mentions (75%)
- **Collaboration**: 21 mentions (75%)
- **Creativity**: 20 mentions (71,4%)
- **Technical skills**: 17 mentions (60,7%)
- **Inclusive attitude**: 10 (35,7%) mentions

Self-Assessment and Personal Development in STEAM

16. Participation in STEAM Training

- **Yes**: 9 respondents (32,1%)
- **No**: 18 respondents (64,3%)
- International professional experience: 1 respondent (3,6%)

17. Self-Assessment of Creativity

- **Average rating**: (on a scale from 1 to 5, 5=excellent)
 - 1 - 2 respondents (7,1%)
 - 3 - 9 respondents (32,1%)
 - 4 - 11 respondents (39,3%)
 - 5 - 6 respondents (21,4%)

18-23: Personal Perceptions on Creativity, Problem-Solving & Innovation

The survey also explored personal attitudes toward creativity, problem-solving, and innovation, with strong positive responses:

- Ability to generate new ideas: 25 respondents agreed to strongly agreed (89,3%)
- Confidence in problem-solving: 26 respondents agreed to strongly agreed (92,8%)
- Interest in technical aspects: 20 respondents agreed to strongly agreed (71,4%)

These responses reflect a strong inclination toward creative and analytical thinking, critical components of STEAM education.

Conclusion

1. **An average educator (including STEAM subject teachers) have moderate knowledge about the STEAM approach. Informative workshops, training materials and technical support is required.**
2. **Art is a significant component of STEAM approach and is considered to be a significant aspect in inclusive and creative education that would also facilitate and improve acquisition and learning of exact sciences.**
3. **As the main challenges were detected: Lack of training, resources, and time constraints.**
4. **Entrepreneurial Relevance: STEAM is strongly connected to creativity, entrepreneurship, and inclusivity.**
5. **To summarize, this survey proves the need for adjusted STEAM-based practical learning materials that would involve the development of creativity, entrepreneurship skills and inclusive methods, thus building a motivating learning environment for young people and adults with less skills.**

TURKEY

Introduction

The survey conducted among 26 participants from Abidin Pak Pakmaya Anatolian High School in Türkiye. The survey aimed to evaluate perceptions and experiences regarding the STEAM (Science, Technology, Engineering, Arts, Mathematics) approach in education.

1. Age Distribution

- 20-35 years: 2 participants (8%)
- 36-45 years: 10 participants (38%)
- 46-55 years: 14 participants (54%)

2. Knowledge of STEAM Approach

- **Average Rating: 3.3**

- **Distribution:**

- 0: 4 participants (15%)
- 1: 2 participants (8%)
- 2: 3 participants (12%)
- 3: 6 participants (23%)
- 4: 7 participants (27%)
- 5: 4 participants (15%)

Comments: The mixed understanding indicates a potential gap in training or exposure to STEAM methodologies. Participants expressed a need for further professional development to enhance their knowledge and application of the STEAM approach, suggesting the importance of targeted training sessions.

3. Areas of Interest in STEAM

Technology: 10 participants (38%)

Art: 8 participants (31%)

Engineering: 4 participants (15%)

Mathematics: 3 participants (12%)

None: 1 participant (4%)

Comments: There is a strong emphasis on technology and arts, which aligns well with current educational trends that prioritize creative and technical skills. This interest could be leveraged to develop STEAM curricula that resonate with educators' passions and expertise.

4. Importance of Integrating Art in Context-Based Learning

Very Important: 20 participants (77%)

Important: 5 participants (19%)

Not Important: 1 participant (4%)

Comments: The overwhelming consensus on the importance of art integration highlights a recognition of art's role in enhancing student engagement and fostering a holistic learning environment. Participants see art as a crucial element that can make STEAM subjects more relatable and enjoyable for students.

5. Previous Use of STEAM in Classes

Yes: 12 participants (46%)

No: 14 participants (54%)

Comments: The lack of prior STEAM implementation among many participants suggests barriers such as resource availability and training. This reflects a need for systemic changes to encourage the adoption of STEAM practices, including providing teachers with the necessary tools and training.

6. Impact of STEAM Subjects on Skills in Other Areas

Average Rating: 4.0

Distribution:

Very Effective: 13 participants (50%)

Effective: 9 participants (35%)

Neutral: 3 participants (12%)

Ineffective: 1 participant (4%)

Comments: Participants noted substantial cross-disciplinary benefits, reinforcing the idea that STEAM education can enhance skills such as critical thinking and collaboration across various subjects. This underscores the need for a curriculum that fosters interdisciplinary connections.

7. Impact of STEAM on Entrepreneurship Skills

Average Rating: 4.1

Distribution:

Very Effective: 14 participants (54%)

Effective: 9 participants (35%)

Neutral: 2 participants (8%)

Ineffective: 1 participant (4%)

Comments: Recognized as beneficial for fostering innovation and creativity among students, participants believe STEAM plays a crucial role in preparing students for real-world challenges. This suggests a potential focus area for curriculum development to include entrepreneurial thinking within STEAM frameworks.

8. Impact of STEAM on Creativity

Average Rating: 4.3

Distribution:

Very Effective: 15 participants (58%)

Effective: 8 participants (31%)

Neutral: 2 participants (8%)

Ineffective: 1 participant (4%)

Comments: There is a strong belief that STEAM encourages creative thinking, which is essential in today's job market. Participants emphasized the need for educational practices that nurture creativity as a core competency.

9. Impact of STEAM on Inclusive Education

Average Rating: 4.0

Distribution:**Very Effective:** 13 participants (50%)**Effective:** 10 participants (38%)**Neutral:** 2 participants (8%)**Ineffective:** 1 participant (4%)

Comments: While perceptions are positive, concerns about implementation challenges indicate that achieving true inclusivity in STEAM requires careful planning and resources. Participants pointed out that without adequate support, the promise of inclusivity may not be fully realized.

10. Challenges in Implementing Inclusive Education within STEAM**Key Challenges Identified:**

- Diverse needs and abilities of students.
- Access to materials and technology.
- Teacher training and awareness.
- Bias and stereotypes affecting student confidence.
- Rigid curriculum structure.

Comments: Participants stressed the need for tailored approaches and additional resources, highlighting that a one-size-fits-all method does not work in diverse classrooms. Addressing these challenges will be crucial for successful STEAM integration.

11. Resources Needed for Better STEAM Implementation**Top Resources Identified:****Training workshops:** 20 participants (77%)**Access to STEAM materials:** 15 participants (58%)**Collaboration opportunities with other teachers:** 13 participants (50%)**Financial support:** 12 participants (46%)

Comments: There is a clear emphasis on the need for collaborative and financial resources. Participants indicated that strengthening community and inter-school collaborations could significantly enhance STEAM implementation.

12. Qualities Needed for Developing Entrepreneurial Skills**Key Qualities Identified:****Creativity:** 22 participants**Problem-solving skills:** 24 participants**Collaboration skills:** 22 participants**Communication skills:** 20 participants**Analytical skills:** 20 participants**Language skills:** 18 participants

Comments: The importance of a supportive environment for fostering these skills was highlighted, suggesting that schools should cultivate a culture that encourages risk-taking and innovation among students.

13. Self-Assessment on Creativity**Average Rating: 4.0****Distribution:**

1: 1 participant (4%)

2: 2 participants (8%)

3: 5 participants (19%)

4: 10 participants (38%)

5: 8 participants (31%)

Comments: Most participants view themselves as creative individuals, which may influence their teaching styles and willingness to adopt innovative teaching methods. This self-perception is vital for encouraging creativity in students.

14. Team Player Assessment

Average Rating: 4.2

Distribution:

- 1: 0 participants (0%)
- 2: 1 participant (4%)
- 3: 5 participants (19%)
- 4: 10 participants (38%)
- 5: 10 participants (38%)

Comments: There is a strong belief in the ability to work collaboratively. This suggests that fostering teamwork among educators can enhance the implementation of STEAM practices.

15. Attitude Towards Challenges

Average Rating: 4.1

Distribution:

- 1: 0 participants (0%)
- 2: 1 participant (4%)
- 3: 6 participants (23%)
- 4: 9 participants (35%)
- 5: 10 participants (38%)

Comments: Participants expressed a willingness to face difficulties, indicating resilience and a proactive approach to overcoming obstacles in education.

16. Impact of Context-Based Methods on Productivity

Average Rating: 4.2

Distribution:

- 1: 0 participants (0%)
- 2: 1 participant (4%)
- 3: 5 participants (19%)
- 4: 10 participants (38%)
- 5: 10 participants (38%)

Comments: Participants noted a positive impact on engagement and results, reinforcing the idea that context-based learning methods are effective in enhancing student learning outcomes.

17. Problem-Solving Skills Self-Assessment

Average Rating: 4.0

Distribution:

- 1: 1 participant (4%)
- 2: 2 participants (8%)
- 3: 6 participants (23%)
- 4: 10 participants (38%)
- 5: 7 participants (27%)

Comments: Confidence in problem-solving abilities suggests a strong foundation for addressing complex challenges in STEAM education. This confidence can encourage students to take initiative in their learning.

18. Interest in Technical Aspects of Surrounding Events

Average Rating: 4.3

Distribution:

- 1: 0 participants (0%)
- 2: 1 participant (4%)
- 3: 5 participants (19%)
- 4: 10 participants (38%)
- 5: 10 participants (38%)

Comments: High curiosity about technical details indicates an eagerness to engage with the practical applications of STEAM, which can enhance the relevance of education in students' lives.

19. Ability to Choose Appropriate Teaching Methods

Average Rating: 4.1

Distribution:

- 1: 0 participants (0%)
- 2: 1 participant (4%)
- 3: 6 participants (23%)
- 4: 9 participants (35%)
- 5: 10 participants (38%)

Comments: Participants felt capable of selecting effective teaching strategies, suggesting confidence in their pedagogical skills that can lead to innovative teaching practices.

20. Ability to Distinguish Between Reliable Sources and Misinformation

Average Rating: 4.2

Distribution:

- 1: 0 participants (0%)
- 2: 1 participant (4%)
- 3: 5 participants (19%)
- 4: 10 participants (38%)
- 5: 10 participants (38%)

Comments: A strong emphasis on critical thinking skills reflects an understanding of the importance of media literacy in education. This awareness is vital in fostering informed and discerning students.

Conclusion

The findings suggest a generally positive perception of the STEAM approach among participants, with strong support for the integration of art and technology in education. However, challenges related to resources, training, and inclusivity must be addressed to fully realize the potential benefits of STEAM methodologies.

Recommendations

- enhancing professional development opportunities,
- fostering collaboration,
- providing essential resources to support educators in implementing STEAM effectively.

Conclusions about the survey results within the consortium

General Awareness and Understanding of STEAM

Teachers in the survey reported a moderate level of knowledge about STEAM. On a scale from 0 to 5, the average knowledge score was 3.0, suggesting that while many educators are aware of the approach, they often lack the experience or training needed to apply it effectively in their teaching. This highlights a clear need for more professional development, particularly in the form of practical training sessions, workshops, and examples of real-life applications.

Some educators said they were already using strategies that match STEAM principles, such as project-based learning, cross-curricular activities, and collaborative problem-solving. However, others said their schools follow a more traditional teaching model, and they feel unsure how to start implementing STEAM without extra support or guidance.

The Role and Value of Arts in STEAM

There was strong support for including Arts as an essential part of the STEAM model. Around 70% of teachers said the artistic and creative elements of STEAM were very important, while 30% considered them somewhat important. These responses confirm that almost all teachers value creativity and expression as important parts of student development.

Many educators noted that Arts help students understand complex ideas in science and technology by allowing them to visualize, design, or build what they are learning. Including Arts also makes lessons more inclusive and motivating, especially for students who learn best through creative tasks rather than traditional academic work.

STEAM and Student Creativity

A major finding from the survey is that teachers believe STEAM greatly supports the development of student creativity. Over 90% of respondents said STEAM either strongly or moderately increases students' creative abilities. Teachers described how STEAM activities—such as designing solutions to real-world problems, building prototypes, or combining science with visual arts—help learners generate original ideas, think critically, and experiment with different approaches.

Educators also emphasized that creativity in STEAM is not just about making art. It is about encouraging students to ask questions, take risks, and develop new ways of thinking. Many teachers said that STEAM projects give students freedom to explore and offer space to express themselves, which leads to greater ownership of their learning.

Several teachers also mentioned that creativity through STEAM can improve motivation, focus, and self-confidence, especially for students who may not do well in traditional tests or lectures. One teacher wrote, "When students are allowed to be creative, they become more curious and willing to try. They are not afraid of making mistakes."

STEAM and Entrepreneurial Thinking

Another key focus of the survey was the connection between STEAM and entrepreneurship. Teachers were asked if they believe that the STEAM approach helps students develop entrepreneurial skills such as creativity, initiative, teamwork, and problem-solving. The average response was 4.0 out of 5, showing that most teachers believe STEAM supports the growth of entrepreneurial mindsets.

Many respondents explained that STEAM projects help students take ownership of their learning in ways that are similar to entrepreneurship. For example, students often work in teams, identify real problems, brainstorm creative ideas, test their solutions, and present their results. These steps are similar to launching a small business or developing a startup idea.

Teachers also pointed out that students learn to communicate their ideas, listen to others, and adapt their plans—all key entrepreneurial traits. Some teachers said they would like more tools and lesson plans that help them link STEAM directly to entrepreneurship, including partnerships with local businesses or simulation activities.

STEAM and Inclusive Education

Another major area of interest in the survey was how STEAM relates to inclusive education. The average rating for STEAM's contribution to inclusion was 3.9 out of 5, suggesting that most teachers find the approach useful and supportive of all learners, regardless of their backgrounds, needs, or abilities.

Teachers reported that STEAM offers multiple ways to learn, including hands-on work, visual communication, and group discussion. This makes it easier to engage students with different learning styles and needs. For example, students with special educational needs (SEN) or language difficulties can participate more easily when tasks are not only based on reading or

writing but involve building, drawing, or performing.

Educators also said that STEAM promotes collaboration and mutual respect, which are essential for creating an inclusive classroom. Team projects allow students to contribute in their own way, and they learn to value each other's strengths. One respondent commented, "STEAM helps all students find their voice. Some might lead with ideas, others with drawing, building, or explaining. Everyone has something to give."

However, educators also pointed out challenges. Inclusive STEAM teaching requires adapted resources, extra time for planning, and sometimes support from teaching assistants. Some educators requested training focused on inclusion within STEAM and guidance on how to use universal design principles to reach all students effectively.

Student Engagement and Cross-Curricular Benefits

Most teachers agreed that STEAM greatly increases student engagement. In the survey, 61% of respondents said STEAM strongly boosts student interest and motivation, and 37% reported a moderate increase. These results confirm that STEAM can help make lessons more exciting, dynamic, and meaningful.

In terms of cross-subject benefits, the average response was 3.2 out of 5. Teachers said that STEAM encourages students to connect knowledge from different areas, such as applying math in science, or using technology to support creative expression. However, many noted that it can be difficult to organize cross-curricular projects without proper planning time and support from school leadership.

Teachers' Needs and Challenges

While most educators support STEAM and recognize its benefits, the survey also revealed several common needs and obstacles:

1. Professional Development

- Many teachers reported that they have never had any formal STEAM training.
- They requested hands-on workshops, online courses, and easy-to-follow lesson examples.

2. Time and Curriculum Pressure

- Teachers said the national curriculum often leaves little room for innovation.
- They need more time for planning and collaboration.

3. Lack of Resources

- Schools often don't have enough materials, tools, or technology for STEAM.
- Teachers want affordable and reusable teaching materials that fit different learning contexts.

4. Collaboration Opportunities

- STEAM teaching often requires teamwork between teachers, but many schools don't have systems for joint planning or co-teaching.
- Teachers called for more team-teaching time, shared planning platforms, and cross-subject Coordination.

Conclusion and Next Steps

The EnterSTEAM survey has provided valuable insight into how STEAM is being perceived and practiced in schools across six European countries. Teachers strongly support STEAM for its ability to promote creativity, entrepreneurship, and inclusive education, while also making learning more engaging and cross-disciplinary.

However, successful implementation still requires overcoming major challenges, including lack of training, limited resources, and structural constraints. Teachers are calling for clear guidance, practical tools, and supportive policies to make STEAM teaching sustainable and Effective.

These findings will directly inform the next stages of the EnterSTEAM project, which will include:

- A methodological guide with clear strategies for integrating STEAM into daily teaching.
- A digital toolkit containing adaptable lesson plans, teacher training resources, and inclusion-friendly practices.

By addressing the real needs of teachers, the EnterSTEAM project aims to empower educators to bring creative, inclusive, and entrepreneurial STEAM learning into classrooms across Europe.

DISCLAIMER

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