



STEAM BO.SS

boosting soft skills

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Best practices



Sapere utile



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1. Introduction

In a constantly evolving labour market, soft skills have become essential for professional success. Over the past twenty-five years, there has been a growing recognition of their significance, confirming their fundamental role in adapting to technological advancements and evolving work processes. Soft skills encompass a broad range of interpersonal and intrapersonal attributes that extend beyond technical expertise, including effective communication, teamwork, problem-solving, creativity, and adaptability. The STEAM Boosting Soft Skills (STEAM Bo.SS) project employs the STEAM methodology, an educational approach that integrates Science, Technology, Engineering, Arts, and Mathematics to foster interdisciplinary learning, enhance problem-solving capabilities, stimulate creativity and critical thinking, and encourage collaboration with local enterprises. The initiative is structured around three principal objectives: improving the transversal competencies of Vocational Education and Training (VET) students, developing STEAM pilot projects aligned with labour market requirements, and harmonising the skill sets of VET trainers with European standards and guidelines. In alignment with the objectives of the 2030 Agenda, this initiative endeavours to reinforce the connection between industry and the VET sector, fostering dialogue and collaboration to address digital transformation and adapt VET frameworks to meet contemporary labour market demands.

The STEAM Bo.SS project is designed to equip trainers with the necessary expertise to implement the STEAM approach effectively. Participants acquire competencies in designing innovative, integrated, and interdisciplinary educational strategies while simultaneously developing critical transversal skills such as problem-solving, teamwork, and time management. The project fosters collaboration among participants, facilitating the exchange of ideas and the practical application of the STEAM method within their own educational environments. Best practices refer to solutions, methodologies, or approaches that have demonstrated particular efficacy in specific contexts, emerging as valuable insights during the team training phases. These best practices constitute a fundamental outcome of the training conducted for trainers, serving as a repository of reliable and tested methods that contribute to the advancement of educational and professional practices. By providing structured approaches to address challenges and promote success, these best practices serve as a critical resource for enhancing instructional methodologies.

This document consolidates the best practices identified during the Training Camp, the Train the Trainers events, and the insights gathered from the Community of Practice (CoP) established through this project, offering trainers a comprehensive reference for effective classroom implementation. The activities outlined herein are concrete,

replicable strategies developed during the training sessions that facilitate the enhancement of students' soft skills through the STEAM framework. These practical examples enable trainers to cultivate creativity, critical thinking, problem-solving, communication, and teamwork within their student cohorts while addressing real-world challenges pertinent to their educational and professional trajectories. The best practices detailed in this document are designed to be highly adaptable across diverse classroom settings, ensuring their applicability in varied educational environments. By actively engaging with complex, real-world problems, students acquire essential transversal competencies that prepare them to navigate contemporary professional landscapes. Through the adoption of these methodologies, trainers will enrich students' learning experiences and equip them with skills that transcend conventional disciplinary boundaries. Ultimately, the overarching aim of the STEAM Bo.SS project is to advance the development of soft skills among VET students, thereby enabling them to successfully integrate into and thrive within the workforce.

2. Methodology

The best practices included in this document were collected through three primary methods: the STEAM Bo.SS Training Camp, the Community of Practice (CoP), and the Train the Trainers events. These methods facilitated the gathering of valuable insights and feedback from participating trainers, ensuring a diverse set of practical activities that can be effectively implemented in the classroom. To maintain consistency across all practices, a structured template—Challenge-Template_final—was employed to capture key elements of each activity, including the STEAM approach, required materials, target audience, and intended objectives. This finalised template serves as a comprehensive framework for documenting activities, though not all fields are mandatory. Instead, it acts as a guide to systematically describe best practices.

The templates used in this project were specifically designed to ensure clarity and uniformity in documenting best practices. Below is a summary of the main fields included within the templates, followed by references to the full versions attached to this document:

- **Title:** Specifies the name of the activity, providing a concise and clear identifier;
- **Brief Description:** Summarises the activity, emphasising its relevance to real-world challenges and pedagogical methods such as problem-based learning (PBL) or the flipped classroom approach;
- **Driving Question:** Outlines the core inquiry guiding the activity, fostering engagement and critical thinking;

- **STEAM Approach:** Details how the STEAM methodology is integrated within the activity;
- **Learning Objectives:** Defines the expected learning outcomes, specifying the knowledge, skills, and competencies participants will acquire;
- **List of Materials:** Enumerates the resources required, including quantities, costs, and procurement links where applicable;
- **Age Range:** Indicates the appropriate age group for participants, using standard educational classifications such as K–12;
- **Didactical Hours:** Specifies the duration of the activity and its breakdown into manageable instructional segments.

For additional details, the complete templates are included in the attachments, offering an expanded structure for each activity.

The systematic collection of best practices is essential as it enables the documentation and dissemination of the most effective experiences, ensuring their broader application in educational settings. By consolidating and refining successful methods, educators and trainers preserve valuable insights that can be shared, adapted, and replicated. This approach fosters a continuous cycle of improvement in teaching methodologies, ultimately enhancing the quality and impact of education and training. Within the framework of the STEAM Bo.SS project, collecting best practices holds particular importance as it provides trainers with actionable, evidence-based strategies for implementing the STEAM methodology in their classrooms. These practices are not theoretical constructs but rather real, tested interventions that have demonstrably improved students' soft skills, including problem-solving, critical thinking, creativity, communication, and teamwork. By making these methodologies accessible to a wider network of educators, the project ensures that such essential skills are cultivated across diverse educational contexts, effectively preparing students for the complexities of the modern workforce.

3. Best Practices emerged from Training Camp

The STEAM Trainer Camp serves as a collaborative platform for trainers, providing an environment conducive to knowledge exchange and peer learning. During this intensive training experience, participants engage in the design and implementation of STEAM-based activities to address real-world challenges while simultaneously integrating crucial soft skills. Through hands-on exercises and collaborative discussions, best practices are identified, enabling trainers to experiment with and refine STEAM-based

teaching methodologies. These sessions generate concrete educational strategies aimed at fostering soft skill development in students.

The best practices presented in this document stem from the activities and projects conceived during the STEAM Bo.SS Training Camp, as aligned with the Guidelines for the STEAM Training Camp. All activities were structured around a central challenge—'Hackathon: Innovative Solutions for Recycling'—which was selected collectively by participants. This challenge was designed to cultivate interdisciplinary competencies through experiential, problem-solving tasks that reflect real-world sustainability concerns. The resulting activities focused on recycling and waste management, serving as the foundation for the best practices detailed in this document.

- **Creative Multimedia Campaigns:** Participants developed awareness initiatives such as school advertising campaigns. In classroom settings, students can replicate this activity by creating marketing materials (videos, posters, or social media campaigns) on topics such as sustainability, fostering creativity, communication, and teamwork;
- **Prototyping Innovative Solutions:** During the camp, participants designed prototypes to enhance recycling practices. This can be adapted for classrooms, where students develop physical or digital prototypes (e.g., new recycling bin designs or environmental tracking apps), promoting problem-solving, adaptability, and STEAM integration;
- **Data Collection and Analysis for Community Impact:** One best practice involved data collection via surveys and community engagement initiatives, such as Clean-Up Days. Students can undertake similar activities by designing surveys, analysing data, and presenting findings on sustainability issues, reinforcing teamwork and analytical skills;
- **Role-Playing and Storytelling for Empathy and Leadership:** Some best practices utilised role-playing and storytelling to explore potential future scenarios shaped by recycling policies. Trainers can implement similar exercises, assigning roles to students to develop leadership, communication, and problem-solving skills;
- **Creative Contests and Visual Design for Impact:** One group designed T-shirts promoting recycling. Trainers can adapt this method by organising design competitions (posters, packaging) to enhance creativity and teamwork while conveying sustainability messages.

These best practices provide educators with concrete, adaptable methodologies for enhancing soft skills through the STEAM approach.

4. Best Practices emerged from Community of Practice (CoP)

After the Training Camp, the Community of Practice (CoP) provides an ongoing platform for trainers to exchange and refine their experiences. Trainers continue to collaborate, contributing valuable insights, which culminate in the creation of an extensive list of best practices. You can explore these best practices further through the following link: [Community of Practice - STEAM Boosting Soft Skills](#).

The practices developed within the CoP highlight how the principles of STEAM can enhance student learning and foster essential soft skills such as teamwork, creativity, and problem-solving. The best practices shared within the CoP focus on three distinct initiatives, each demonstrating how interdisciplinary approaches can address real-world challenges. These practices are designed to promote creativity, critical thinking, and effective communication—skills that are indispensable in both educational and professional settings. By engaging with real-world problems, students are encouraged to apply their interdisciplinary knowledge and gain practical experience, preparing them for future success.

Best practice 1: COMMUNITY SPACES

This best practice encourages students to design inclusive community spaces, creating scaled models using recycled materials such as cardboard and plastic. The designs incorporate accessible elements, such as gardens and play areas, to meet the community's needs. Each group presents their best practices, supported by reports on the social impact, using STEAM principles to tackle real-world issues. Key teaching elements from the COMMUNITY SPACES best practice include:

- **Creativity & Design Quality:** Students employ creative problem-solving skills to design innovative community spaces using recycled materials;
- **Inclusion & Accessibility:** The designs promote social inclusion through accessible features that could be utilised by all members of the community;
- **Teamwork & Problem-Solving:** In teams, students identify community needs and reflect on the strengths and weaknesses of their designs, thereby enhancing their collaborative and problem-solving abilities.

Best practice 2: Creating a Shop Using a STEAM Approach for Commerce and Sales Students

This best practice guides students in creating a retail shop, either virtual or physical, where they develop a comprehensive business plan that includes market research, product selection, store design, branding, and financial planning. By applying STEAM principles, students gain practical entrepreneurial experience while enhancing soft skills such as teamwork, problem-solving, and critical thinking. Key teaching elements from the "Creating a Shop Using a STEAM Approach" best practice include:

- **Application of STEAM Skills:** Students apply science (market research), technology (website design), engineering (store layout), art (branding), and mathematics (financial planning) in their shop design;
- **Entrepreneurial Thinking:** The best practice fosters creativity and strategic thinking as students develop business plans and pricing strategies;
- **Collaboration & Teamwork:** Students collaborate in teams, working on store concepts and marketing strategies, enhancing communication and cooperation;
- **Market Research & Financial Planning:** Students conduct research on consumer behaviour and competitors, applying mathematical principles for budgeting, sales projections, and pricing strategies.

Best practice 3: Advertising Our School – A Creative STEAM Best Practice

This best practice challenges students to create an advertising campaign to promote their school. Working in teams, students integrate the STEAM principles—science, technology, engineering, arts, and mathematics—to develop a multimedia presentation. The best practice fosters teamwork, communication, creativity, and problem-solving, through Project-Based Learning (PBL) and Flipped Classroom techniques. Key teaching elements from the "Advertising Our School" best practice include:

- **Project-Based Learning (PBL):** The PBL approach ensures students take ownership of their best practices, working collaboratively on real-world problems;

- **Creative Design & Communication:** Students develop engaging visuals and messages, practising clear communication within their teams and during the final presentation;
- **Teamwork & Role Assignment:** Roles are allocated based on individual strengths, fostering balanced participation and effective collaboration;
- **Feedback & Reflection:** After the presentations, feedback from peers and trainers encourages reflection, helping students identify strengths and areas for improvement.

These best practices integrate STEAM principles with real-world challenges, fostering creativity, critical thinking, and teamwork while enhancing students' problem-solving skills and soft skills such as communication and collaboration.

5. Best Practices emerged from Train the Trainers

The "Train the Trainers" events are organised in each participating country, and from these sessions, best practices (BP) are collected, with subsections for each country. These events provide trainers with the opportunity to deepen their understanding of how to effectively implement the STEAM approach, with a particular focus on soft skills development. Participants are encouraged to share their experiences from the Training Camp and adapt them to new contexts, exploring how best practices can be tailored for various educational settings. The event also fosters networking and the creation of a community of practice among trainers, which continues to support the exchange of ideas and resources beyond the event itself.

Utilising the same template, the following activities were carried out during the "Train the Trainers" event, from which the best practices outlined below emerged:

SPAIN:

During the "Train the Trainers" sessions, all participants were presented with the same case study situation: The Regional Education Authorities have launched a new call for all publicly funded schools to improve their infrastructures and "spaces." Teachers, using the STEAM approach, will be able to present their proposals in a regional competition, where the best proposal will receive funding for their project. The participants were divided into heterogeneous groups of four, with a mix of teachers from different departments and fields. After receiving the case study, each group was

tasked with planning a project using the STEAM methodology, with a particular emphasis on including soft skills.

The main goals of this activity were:

- To improve cooperation among participants (teachers and students).
- To reflect on how architectural design can influence social interaction and accessibility.
- To investigate the key characteristics of school spaces.
- To incorporate accessibility features and interactive areas.

Each group presented their design, explaining how it promotes coexistence and meets the specific needs of school communities.

Two projects were selected as exemplary best practices:

1. "BETTER SCHOOLYARDS"

This coeducational project aims to create inclusive, equitable, and diverse outdoor spaces in schools, where all students, regardless of gender, can learn and interact without reinforcing stereotypes or discrimination.

Key objectives:

- **Promote Gender Equality:** Ensure that playgrounds provide equal opportunities for all students to engage in diverse activities.
 - **Student Participation:** Involve students in the design process to ensure the playground reflects their interests and preferences.
- STEAM methodology:
- Reflect on the impact of spaces on the cognitive and emotional wellbeing of the school community.
 - Research space design and materials.
 - Budget and economic costs.

2. "SHARED SPACES"

This project transforms the school library into an interactive, collaborative environment while also providing students and teachers with a quiet place to relax, talk, and share ideas. Instead of a traditional silent library, this initiative creates dynamic learning zones where students can discuss and innovate together. By transforming the library into an interactive STEAM hub, this project fosters a culture of collaborative exploration, ensuring that students view learning as a shared experience rather than a solitary task.

Key objectives:

- **Encourage Collaborative Learning:** Foster teamwork and knowledge exchange among students from diverse backgrounds.
- **Promote Creativity and Critical Thinking.**
- **Make Learning Accessible and Inclusive:** Ensure that all students, regardless of abilities or interests, feel welcome and engaged.

STEAM methodology:

- Create different zones: Innovation Lab, Creative Corner, Discussion Hub, and Quiet Thinking Area.
- Set up hands-on activity zones with robotics kits, 3D printers, coding stations, and engineering challenges.
- Develop group challenges where students must use multiple disciplines to solve problems.

ESTONIA:

Our best practices:

1) Game: Trash Poetry (*aka "Creative Junk Mashup"*)

Purpose:

To boost creativity, collaboration, and upcycling thinking through a fast-paced, hands-on game inspired by the SCAMPER method.

Preparation:

Each participant brings a small bag of items from home – things they no longer use but can't quite throw away. Think: a broken bracelet, a worn slipper, an old toy, a key with no lock...

How to Play:

1. **The Pile:**

Everyone empties their bags into the middle of the room, creating one big, glorious junk pile.

2. **Sort Round – “Color!”**

The game leader shouts: **“Color!”**

Everyone begins sorting the items based on color – pink in one pile, white in another, multicolored in a third, and so on.

3. **Create Round – “Combine!”**

The leader calls: **“Combine!”**

Each player reaches into a color pile with both hands, pulls out **two random objects**, and puts them together to see:

- **Could this new hybrid object serve a new function?** (find connections with knowledge from the fields of STEAM (engineering, chemistry, technology)

Example: a pink toy bunny + a worn-out pink slipper = a comfy slipper again – the bunny covers the hole and makes it cute too!

4. **More Rounds – Different Attributes:**

Repeat the sorting and combining based on other attributes:

- **“Shape!”, “Material!”, “Function!”, etc.**

5. Encourage players to explore possibilities using the **SCAMPER** technique:

- **S – Substitute**

- C – Combine
- A – Adapt
- M – Modify (shape, color, function)
- P – Put to other use
- E – Eliminate or expand
- R – Reverse or reimagine

6. (Optional) Poetry or Storytime:

At the end, players can write a short **poem or story** about their hybrid creation.

Where did it come from? What's its new purpose? What's its name?

Outcome:

- Fun, fast, and full of laughter
- Sparks creativity and problem-solving
- Demonstrates the power of repurposing
- Applies the SCAMPER technique in a hands-on way
- Builds empathy through storytelling

Age range: K-12, students

2) "Journey to the Middle Ages"

The goal of the interdisciplinary learning project is to create a versatile presentation about the medieval churches in the local area.

Group tasks:

1. Create a podcast episode in interview format to introduce the selected churches (*media literacy*)

2. Design the church floor plans based on architectural layouts and build a paper model (*artistic competence*)



3. Use design software to create a 3D model of the church (*ICT competence*)
4. Prepare informative texts based on historical sources, translate key descriptions into foreign languages, and create a map of medieval churches (*historical and linguistic competence*)

Brainstorming session to discuss how to use the materials created during the project to promote local tourism.

Age range: K-12

ITALY:

- **"The Water Shape" - Storytelling and Problem-Solving Activity**
In this activity, participants are divided into groups and given a real-world problem to solve. They must create a story based on the context and solve the problem by assuming assigned roles. The facilitator can alter roles or add elements to the story to stimulate further reflection. Key teaching elements from this activity include:

- Promote creativity and holistic thinking, especially in storytelling.

- Manage group dynamics and roles to enhance awareness of the context.
- Foster problem-solving and collaboration through group work.
- **"Chart GPT" - Planning Sustainable Trips with AI**
Participants are tasked with planning a sustainable trip, choosing transportation, accommodation, stops, and budget, while using AI to optimise the planning process. Key teaching elements collected include:
 - Integrate AI as a practical tool for solving real-world problems.
 - Combine group work with gamification to engage and motivate participants.
 - Provide a real-world context to demonstrate how AI can be used in everyday situations.
- **"Wanna Be a Star" - Interview and Role-Playing**
In this activity, participants work through technical and relational scenarios, exploring decision-making and strategies through discussion and research. Key teaching elements from this activity include:
 - Use role-playing to creatively address real-life situations.
 - Encourage group work to stimulate out-of-the-box thinking.
 - Include continuous feedback moments to foster reflection and improvement.

PORTUGAL

The Portuguese Train the Trainers programme adopted a highly practical and participant-centred approach, enabling trainers to experience the STEAM methodology from both theoretical and practical perspectives. Rather than focusing exclusively on the conceptual framework, the training encouraged participants to actively explore how interdisciplinary learning can be applied in vocational education and training (VET) environments.

One of the most valuable practices was the presentation of a real-life STEAM example through the concept of a **Community Technological Garden**. This activity illustrated how Science, Technology, Engineering, Arts and Mathematics can be integrated into a single project while simultaneously promoting environmental awareness, community involvement and transversal competences. By analysing this example, participants gained a clear understanding of how authentic learning experiences can connect educational objectives with real societal challenges.

Another best practice was the structured methodology proposed for designing STEAM activities. Trainers were guided through a step-by-step process, from defining learning objectives and selecting relevant themes to planning interdisciplinary integration, developing activities, piloting them and refining them based on learners' feedback. This systematic approach provided participants with a practical framework that can be easily adapted to different educational contexts.

Special emphasis was also placed on the integration of soft skills within STEAM learning. Throughout the training, participants reflected on the importance of competences such as proactivity, conflict management, time management, flexibility, problem-solving and decision-making. Rather than treating these competences as isolated learning outcomes, the training demonstrated how they can be naturally embedded within collaborative STEAM activities.

The practical Hackathon dedicated to developing awareness-raising concepts for recycling represented another significant best practice. Working collaboratively, participants were challenged to apply STEAM principles while addressing a real sustainability issue. This activity fostered creativity, teamwork, communication and critical thinking, while demonstrating the effectiveness of challenge-based learning as an engaging educational methodology.

Finally, the training concluded with an individual reflection on how participants intended to implement the acquired methodologies in their own teaching practice. This transfer-oriented approach encouraged trainers to critically analyse their educational contexts and identify concrete opportunities to incorporate STEAM methodologies into their future training activities, reinforcing the sustainability and long-term impact of the learning experience.

Overall, the Portuguese Train the Trainers programme demonstrated that combining theoretical foundations, practical experimentation, collaborative learning and structured reflection constitutes an effective model for preparing trainers to successfully implement

STEAM methodologies and promote the development of transversal skills within VET education.

Conclusion:

The practices that emerged from these events suggest that effective group management, as well as a focus on practical, interactive experiences, are critical for the success of these activities. The integration of soft skills such as problem-solving, creativity, and collaboration into the STEAM methodology enhances the learning outcomes for all participants.

6. Best Practice Summary

The general principles emerging from the STEAM Bo.SS project are essential for the successful integration of the STEAM approach into educational settings. These principles not only inform the specific activities carried out during the project, but also play a key role in fostering essential soft skills in students, such as creativity, teamwork, communication, and problem-solving.

One core principle is **Hands-On, Project-Based Learning (PBL)**, which engages students in real-world challenges. This approach promotes critical problem-solving and thinking skills, while encouraging collaboration, exploration of multiple solutions, and the development of creative ideas. As students work on tangible projects, they become better prepared to adapt to various challenges, making the learning process both dynamic and engaging.

Another fundamental aspect is **Interdisciplinary Teaching**, which integrates science, technology, engineering, arts, and mathematics into a cohesive learning experience. By addressing real-world problems from multiple disciplinary perspectives, students gain a deeper understanding of how knowledge from diverse fields can be applied in different contexts. This interdisciplinary approach nurtures creativity, curiosity, and innovation, enabling students to tackle problems from various angles.

The project also emphasizes the importance of **Soft Skills Development**. Soft skills like communication, teamwork, leadership, and adaptability are increasingly essential in today's workplace. The STEAM activities are designed to cultivate these skills, as they often require students to collaborate, clearly communicate ideas, and effectively manage their work. By fostering these competencies, the project helps students develop skills that are critical for success in both academic and professional settings.

In addition, many of the activities focus on **Encouraging Innovation and Sustainability**, particularly through projects related to recycling and environmental awareness. These activities encourage students to think creatively about addressing social and environmental challenges, fostering a sense of responsibility and empowering them to contribute to a better world. By understanding real-world issues, students are encouraged to take proactive steps toward sustainable solutions.

Finally, **Ongoing Collaboration and Communities of Practice** are central to the project's success. Through the continuous exchange of ideas among trainers and the creation of Communities of Practice (CoPs), educators can refine their methods and ensure that the best practices developed are implemented effectively. This ongoing collaboration

enhances the learning experience for students, while creating a culture of shared knowledge and growth within the educational community.

By integrating these principles into their teaching, trainers can better equip students to succeed in both the classroom and in their future careers, ensuring that they are prepared to face the challenges and opportunities of the modern workforce.



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