STEAM BOSS

boosting soft skills

SWOT Analysis

Pilot Projects

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1. INTRODUCTION

The European project "STEAM Boosting Soft Skills" (approved by the Italian National Agency INAPP, 2023-1-IT01-KA220-VET-000163992) adopts the STEAM approach, an educational methodology that integrates science, technology, engineering, art and mathematics to promote the development of soft skills. In the ever-changing landscape of the labour market, which is constantly undergoing upheaval, soft skills have in fact become increasingly crucial for professional success. By collaborating with local companies, the project aims to achieve three key objectives:

- To enhance the soft skills of students enrolled in vocational education and training (VET) programmes;
- To develop STEAM pilot projects in line with the needs of the labour market;
- To bring the skills of VET trainers into line with European standards.

As part of the planned activities, teachers and trainers from the various partner countries, who had previously received training in the STEAM approach during the initial phase of STEAM Bo.SS., designed, in collaboration with local companies, a series of pilot projects aimed at VET students. The five projects carried out applied the STEAM methodology to enhance the soft skills identified as priorities by the companies involved.

To critically analyse the projects developed, ensuring their effectiveness and identifying potential areas for improvement, each pilot project underwent a SWOT analysis. The analysis was conducted using an international peer review approach, employing a cross-review methodology: each project was assessed by trainers and teachers from a partner country other than the one in which the project was developed. Specifically:

- Italy's pilot projects 1 and 2 were analysed by Spanish trainers;
- Portugal's pilot project was evaluated by Estonian trainers;
- Spain's pilot project was analysed by Portuguese trainers;
- Estonia's pilot project was evaluated by Italian trainers.

This cross-SWOT analysis methodology offered several advantages. Firstly, it facilitated an external and impartial view of the projects, reducing the risk of self-referentiality and allowing for a more objective assessment of strengths, weaknesses, opportunities and threats. Furthermore, the comparison of different educational and training contexts helped to highlight the European dimension of the project, bringing to light transferable good practices and innovative approaches applicable in other national contexts. Finally, the cross-analysis stimulated professional exchange among the partners, contributing to the development of the trainers' evaluation skills and strengthening the overall quality of the project outcomes.

This document presents a SWOT analysis of the pilot projects developed within the STEAM Bo.SS partnership. The document begins with a description of the SWOT methodology adopted, before presenting detailed SWOT analyses of the individual national projects. Finally, the document goes beyond the analysis of individual cases, offering a cross-cutting overview that summarises recurring patterns, shared challenges and common strengths that emerged from all the pilot projects. Based on this evidence, a set of recommendations is formulated, aimed at

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supporting the improvement, scalability and long-term impact of the STEAM-based educational models developed within the project.

As part of the project, summaries of the various projects carried out were also produced, together with an analysis document that compiles and interprets the levels of satisfaction of the students and trainers involved in the design and delivery of the activities.

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2. SWOT ANALYSIS

This document contains the SWOT analysis for the pilot projects of the STEAM Bo.SS partners.

The SWOT analysis evaluates the following aspects for each project:

- **STRENGTHS:** internal, positive factors that give a project, idea, company, individual, etc. an advantage over the rest.
- **WEAKNESSES:** internal, negative factors that put an idea, project, individual, company, etc. in a weak or disadvantageous position compared to others.
- **OPPORTUNITIES:** positive external factors that can be used to the benefit of a project, idea, company or individual.
- **THREATS:** external factors that pose a difficulty, burden or inconvenience to the project, company, idea or individual.

2.1. Estonian project: sustainable waste challenge

STRENGTHS	WEAKNESSES
The project offers a wide range of activities, allowing young people to approach the topic of sustainability from different perspectives. The activities are practical, interactive and allow students to tackle a real problem with creativity: this allows them to develop various soft skills (teamwork, problem solving, effective communication, etc.). The students work on a problem that is also perceived at the local level, as demonstrated by the intervention of the Environmental Department of Saaremaa Municipality; the project is therefore contextualized in their everyday reality and acquires social relevance. Students are made aware of the importance of soft skills.	Some activities (e.g. Urban Environment Robotization project') may require basic skills that not everyone possesses (e.g. Python) 16 hours to deal with these issues could be very challenging, and there is a risk of missing out on useful insights needed to fully grasp all the nuances of the topic, remaining instead at a superficial level For some activities (e.g. "Urban Environment Robotization project"), specific resources are required that are not always available and accessible to everyone (e.g. mBot robots) It is not always clear how the division into working groups takes place and whether these remain homogeneous across different activities The timing of the various activities is unclear (e.g. how much time should be devoted to the "Creative Junk Mashup" activity? How much time

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Raise students' awareness of the importance of recycling and/or finding new uses for products and objects. The use of the game is engaging and stimulating for students, who will be more involved in the activities. The use of pre- and post-questionnaires, together with feedback from students and teachers, allows for effective impact assessment. STEAM Approach is well developed.	should be devoted to the various stages of the activity?...) Could you provide more details on how feedback is collected at the end of the first day: do students express their opinions? Do trainers give feedback on how the activities went? If so, is this individual feedback or specific to different groups? When working in groups, some students may not participate actively in activities, delegating work to other group members. Some participants may perceive the topic of waste as “boring” or uninspiring if they are not properly motivated
OPPORTUNITIES	**THREATS**
Sustainability is currently one of the most popular fields in the labour market, also at international level The project helps to introduce the younger generation to the topic of sustainability, allowing young people to discover an interest in the subject and possibly enroll in post-secondary courses in this field. This helps to reduce the mismatch between supply and demand for green jobs, which are increasingly sought after by companies today Students can also become advocates for the importance of sustainability among other students and at the community level The format is easily adaptable to other geographical and educational contexts The activity allows them to connect with stakeholders with whom they could establish collaborations for their professional future	Given the uncertain global situation, sustainability may take a back seat among government priorities Without adequate guidance from teachers or experts, public discussions may remain general or poorly grounded in real data

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The project can become the basis for more extensive school modules on environmental education or educational innovation.	

2.2. Portugal: Digital Escape Room with Social Impact

STRENGTHS	WEAKNESSES
Integrates STEAM and focuses on soft skills. Brings together students from different fields to aid with diverse thinking. Project-Based Learning methodology helps with student ownership, active learning, creativity, and practical application of skills. Use of free, accessible digital tools encourages digital literacy. Clear roles aid with soft skills development. The project is flexible asThe Escape Room can be adapted to different literacy levels and topics. There are different ways of assessment that help perfect the project.	Groups may be imbalanced in terms of motivation or prior knowledge. Trainers need to balance technical know-how with pedagogical guidance. It may be difficult to keep the focus on the depth of the problem, and the focus may be more in aesthetics. Games developed for a specific group or issue may not be reusable for broader audiences. If the target audience includes non-native speakers, both game content and teamwork could be impacted Keeping everyone engaged over a whole month—especially with breaks and holidays around July—can be tricky. Without deeper guidance, students might create overly simplistic games that don't achieve educational or social goals.
OPPORTUNITIES	**THREATS**
Final projects could be piloted with vulnerable audiences. This pilot can become a model for a full curriculum unit across schools.	Vulnerable audiences (e.g., elderly, migrants, people in rural areas) may lack internet access or digital literacy, limiting real-world impact. Free tools may have limitations, bugs, or even disappear, which can interrupt progress.

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Projects can be submitted to competitions, fairs, hackathons, or featured in community showcases to gain recognition and motivate students. Students can connect with professionals or municipalities that can lead to internships, mentorships, or collaborative projects. Strong partnership with AI9.PT can boost some further projects or opportunities for students.	Trainers could face overload especially when dealing with multiple aspects at once.

2.3. Spain: breaking barriers and building bridges

STRENGTHS	WEAKNESSES
High social relevance: the topic of inclusion and accessibility is current, urgent and generates empathy, increasing its impact on the educational and external community. Active methodology (Challenge-Based Learning): promotes involvement, autonomy and practical learning, moving away from traditional methods. Real partnership with a company (Novodecor): ensures applicability, proximity to the professional world and credibility for students. Emotional involvement (empathy): dynamics such as the use of glasses simulating disabilities or wheelchairs allow for transformative learning. Diversified results: the final products (plans, mockups, campaigns, podcasts) allow students to explore different talents. Development of cross-cutting skills: creativity, teamwork, communication, critical thinking, organisation and social responsibility.	Limited execution time (10 days/35 hours): does not allow for a very indepth approach or implementation of the proposed solutions. Heterogeneous level of students: not all students have sufficient experience or maturity to deal with such a complex topic, which can lead to unequal contributions. Lack of structured continuity: risk of being an 'isolated event' without follow-up by the company or school. Dependence on motivation and active participation: students who are not very involved or proactive can compromise the group dynamic. Solutions that are too conceptual: as time is short, proposals can become too theoretical and not very applicable to the real world. Risk of superficiality: the topic of inclusion is complex and can be treated in a simplistic manner if there is no depth in the analysis.

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OPPORTUNITIES	THREATS
Increased visibility and reputation: it can be communicated on social media, in the local press, on the school's website and to partners, showcasing its impact and pedagogical innovation. Business awareness: students' proposals can influence real business practices, opening doors for future collaborations. Replicability and scalability: the model can be adapted to other sectors (catering, transport, tourism), expanding the project's reach. Alignment with European policies: it fits into agendas for inclusion, sustainability and innovation (Erasmus+, Horizon Europe, etc.), which may facilitate future funding. Student empowerment: they gain confidence as consultants and agents of change, which strengthens their professional integration. Real STEAM integration: it combines science, technology, engineering, art and mathematics in a concrete problem, serving as a case of good pedagogical practices.	Difficulty in measuring real impact: even with good ideas, it can be difficult to assess whether the proposed solutions generate concrete changes. Excessive focus on creativity vs. feasibility: students may create original proposals that are difficult to implement in practice. Little continuity after the project: without a follow-up plan, ideas may not progress beyond the prototype/presentation stage. Technical and material limitations: access to design, prototyping and software tools may affect the final quality.

2.4. Italy: Marketing strategy for a new spin-off

STRENGTHS	WEAKNESSES
STEAM oriented technical project. Age range (participants with work experience who can share a lot of good ideas and work-related practices).	The project stretches through several weeks so maybe the time gap between the sessions will make ideas and focus dissolute.

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The difference in age of the participants can be seen as an opportunity for mutual learning and updating of knowledge. The list of soft skills that will be developed through this project is significant, work-oriented and updated. Availability of suitable digital resources in the venue. The self-assessment questionnaires are thorough and meaningful. The content of each session is well planned and clearly organised. The use of methodologies focused on the student, such as PBL and flipped classroom, are very inspiring. STEAM approach is clearly described and developed.	The duties between some of the different sessions (work for the next meetings) are too demanding and ambitious. A catchy name for the project should be proposed (there is no title). There isn't a clear schedule with the duration of each session (number of hours). The project doesn't mention in which way will the participants be divided into groups (how many groups? how many members in each group?) The use of acronyms can be confusing for people not expert in the field (CTRM, CPM, etc.)
OPPORTUNITIES	**THREATS**
Digital Marketing is currently one of the most popular fields in the labour market (emergent market trend). The employability of project participants may improve after the training. Opportunity of knowing how a company works from inside. Backing of a well-established company.	The current political instability may negatively affect the technology sectors. A high demand of technological knowledge in this project that some participants may not have. The digital world involves a constant update, and it may be difficult for the participants to cope with.

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2.5. Italy: Fresh Taste, Fresh Take

STRENGTHS	WEAKNESSES
Catchy and appealing name of the project. Age range (participants with work experience who can share a lot of good ideas and work-related practices). The difference in age of the participants can be seen as an opportunity for mutual learning and updating of knowledge. The use of a PBL methodology focused on the student is very inspiring. The tasks of the groups are clearly defined. The content of each session is well planned and perfectly organised. STEAM approach is described and developed in an excellent way, including all its points. Availability of suitable digital resources in the venue. The list of soft skills that will be developed through this project is significant, work-oriented and updated. There is a specific timetable with the duration of each session (number of hours).	The project stretches through several weeks so maybe the time gap between the sessions will make ideas and focus dissolute. The duties between some of the different sessions (work for the next meetings) are too demanding and ambitious. Although the list of soft skills is meaningful, it is also short. Some other skills could have been mentioned, such as teamwork, communication skills, problem solving, etc. Although the division into groups is clearly developed, it is not mentioned in which way the participants will be divided into groups (how many groups? how many members in each group?)
OPPORTUNITIES	**THREATS**
B2C products are more sustainable and environmentally friendly. New market niche (out-of-town students) with a huge growing potential. Updated products, especially the vegan option (vegan ragú), which are more and more demanded and appreciated by society.	The target audience is very narrowly defined and that could be riskier. Traditional buyers are excluded. Market niche could not be enough to obtain benefits for the company. Public in general may have preconceived ideas against vegan/organic products .

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Huge use of social media among digital natives customers. Changes in customers and clients purchasing habits (B2C) Growing social interest in healthy habits, especially related to food. Participants in the project will have the chance to know how a big company works and that can be a very rewarding and useful experience. This is an opportunity to bring traditional cuisine closer to younger generations. ECooking and eating good quality food don't have to be difficult or expensive. It can be an opportunity to update traditional recipes and cuisine. The employability of project participants may improve after the training.	The elevated prices of this kind of products can be a drawback for consumers. The knowledge required to carry out the task may be too demanding for participants, specifically the alternative positioning of the product.

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3. CROSS-CUTTING FINDINGS AND RECOMMENDATIONS

This section synthesizes the main findings emerging from the SWOT analyses of the pilot activities implemented in Estonia, Portugal, Spain, and Italy. Rather than reiterating project-specific observations, it highlights **transversal patterns**, **shared challenges**, and **strategic recommendations at Work Package level**, with the aim of supporting refinement, scalability, and long-term impact of the proposed educational models.

3.1. Cross-cutting strengths

Across all analysed projects, several common strengths clearly emerge:

- **Strong pedagogical alignment**: All initiatives are grounded in active learning methodologies such as Project-Based Learning (PBL), Challenge-Based Learning, and game-based approaches. These methodologies consistently promote student engagement, autonomy, creativity, and practical problem-solving.
- **Well-developed STEAM integration**: Each project integrates STEAM dimensions in a concrete and applied manner, linking technical knowledge with social, environmental, or economic challenges. This interdisciplinary approach is a shared asset and aligns well with Erasmus+ priorities.
- **Emphasis on soft skills**: The development of transversal competences, such as teamwork, communication, critical thinking, creativity, and problem-solving, is a recurring strength across all contexts. These skills are explicitly addressed and often embedded in collaborative and real-world tasks.
- **High social relevance**: Whether addressing sustainability, social inclusion, digital literacy, or employability, all projects engage with topics that are current, meaningful, and closely connected to societal and labour-market needs, increasing their perceived value for participants.
- **Potential for transferability**: Most activities are designed in a way that allows adaptation to different educational levels, disciplines, and geographical contexts, supporting replication and upscaling at European level.

3.2. Recurrent weaknesses

Despite their strengths, several common weaknesses were identified across multiple projects:

- **Time constraints and pacing issues**: Limited overall duration or long gaps between sessions frequently constrain the depth of analysis, reflection, and implementation. In some cases, ambitious objectives risk leading to superficial outcomes due to insufficient time.
- **Group management and participation balance**: Across different contexts, challenges emerge in ensuring balanced participation within groups. Differences in motivation, prior knowledge, or experience may result in uneven contributions.

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- **Insufficient operational clarity**: In several projects, aspects such as group composition criteria, timing of specific activities, workload between sessions, or feedback collection mechanisms are not fully specified, which may affect consistency and replicability.
- **Resource dependency**: Some activities rely on specific technical resources (software, hardware, digital tools) that may not always be equally accessible, potentially limiting inclusiveness and scalability.

3.3. Shared threats and external risks

The SWOT analyses also highlight common external factors that may affect implementation and impact:

- **Risk of superficial engagement**: Without adequate guidance and scaffolding, complex topics (e.g. sustainability, inclusion, social impact) risk being addressed in an overly general or simplified manner.
- **Motivational challenges**: Participant engagement may vary depending on prior interest, perceived relevance of the topic, or external factors such as academic calendars, holidays, or competing commitments.
- **Contextual and systemic uncertainties**: Political, economic, or technological changes (e.g. shifting policy priorities, digital tool availability, market instability) may influence both the relevance and sustainability of the initiatives.
- **Difficulty in measuring long-term impact**: While many projects include self-assessment or feedback mechanisms, assessing concrete and lasting impact beyond the immediate educational setting remains challenging.

3.4. Work Package–level recommendations

Based on the cross-cutting analysis, the following recommendations are proposed at WP level:

- **Strengthen methodological documentation**: Provide clearer guidance on group formation, activity timing, feedback collection, and assessment procedures to enhance transparency, comparability, and replicability across contexts.
- **Balance ambition and feasibility**: Align learning objectives more closely with available time and resources, prioritising depth of engagement over the number of activities when necessary.
- **Reinforce facilitation and scaffolding**: Ensure the presence of adequate pedagogical and technical support to help participants engage meaningfully with complex topics and avoid superficial outcomes.
- **Enhance impact evaluation strategies**: Complement self-assessment tools with qualitative feedback and, where possible, follow-up mechanisms to better capture medium- and long-term effects.
- **Plan for continuity and scalability**: Encourage links with schools, companies, or local stakeholders beyond the pilot phase, transforming isolated experiences into sustainable educational pathways or modules.

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Overall, the comparative analysis demonstrates that, despite contextual differences, the projects share a strong pedagogical vision and significant potential for impact. Addressing the identified weaknesses and risks at Work Package level will further strengthen coherence, effectiveness, and long-term sustainability of the initiative.

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THE BOOST THAT MAKES THE DIFFERENCE

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