STEAM BOOSS

boosting soft skills

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Guidelines for the STEAM Training Camp

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1. Introduction

The **STEAM Training Camp** of the **STEAM Bo.SS project** aims to train teachers on how to use the **STEAM method** (Science, Technology, Engineering, Arts, Mathematics). Teachers will learn how to create innovative, integrated, and interdisciplinary educational activities, also developing transversal skills such as problem-solving, teamwork, and time management. The camp promotes collaboration among participants, allowing them to exchange ideas and apply the STEAM method in their classrooms.

When: November 5-6, 2024
Where: University of Modena and Reggio Emilia, Modena, Italy
Duration: 2 days

1.1 Motivations and Objectives

The Training Camp was designed to promote collaboration between trainers and teachers in an inspiring environment. The objectives include:

- **Sharing good practices and peer learning**: creating a learning community where participants can share experiences and ideas.
- **Developing activities based on the STEAM approach**: designing innovative and multidisciplinary solutions to address real challenges.
- **Integrating soft skills**: fostering the development of essential skills alongside technical design.

1.2 Results of the camp

- Create a STEAM program based on a real challenge.
- Integrate at least 3 soft skills from those previously identified as most valuable for companies: decision-making, problem-solving, conflict management, proactivity, time management, and flexibility.
- Integrate the use of innovative methodologies, such as teamwork and hands-on activities.

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2. The STEAM Method

Why the STEAM Method?

The STEAM method integrates different disciplines to address real problems in a creative and innovative way. It promotes transversal skills like problem-solving and teamwork, preparing students for the complex challenges and demands of the modern world. It is valuable because it combines theory and practice, developing both technical and creative skills.

Integration of Soft Skills

The STEAM method also integrates soft skills to enhance collaboration and develop practical and innovative solutions. These soft skills are essential for managing challenges in today's world and preparing students to work in teams.

3. Structure and Methodology of the Camp

The camp aims to take a hands-on approach, providing practical pointers rather than detailed explanations typical of a traditional lecture. It is based on the assumption that participants have already started watching the MOOC videos. The goal is to offer insights into theories and knowledge while providing practical tools that can be immediately experimented with and applied. This approach encourages participants to put what they learn into practice right away, equipping them with the necessary tools to experiment and grow in their learning journey.

3.1 First Day

First phase: Introduction to the STEAM approach

Theoretical explanation of the STEAM model to highlight the potential of interdisciplinary solutions.

First activity: Creating a small group activity

Objective: Familiarize participants with the STEAM creative process through a practical and collaborative exercise.

Second activity: Launching the challenges

Each group will choose a challenge from the options presented and develop an initiative plan based on the STEAM approach. Groups will receive:

- A guide for creating a STEAM activity.
- Additional materials on concepts like creativity and soft skills.

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Motivation: Providing guidelines and basic ideas helps initiate the work and encourages more structured solutions.
Objective: Guide the groups in the structured design of an initiative adopting the STEAM approach, providing support and resources to stimulate creativity, collaboration, and practical application.

3-Station activity

Deepening soft skills through interactive sessions with the trainers. Each station will be a place to deepen a specific soft skill with insight from experts and suggestions for practical tools. Groups will rotate between three stations where trainers will present key transversal skills.

Objective: Provide participants with practical tools to integrate soft skills into their STEAM projects, improving the quality of the proposed solutions and developing essential skills for teamwork and managing challenges.

3.2 Second Day

Development of the initiative plan

Group work on the STEAM activity. After choosing a challenge, groups will continue to work on designing and developing a complete program. This work will continue in multiple sessions, with checkpoints in key moments to receive feedback and refine ideas.

Checkpoints and review of the work

Periodic checkpoints: Each group will share progress with trainers and other participants.
Objective: Verify the direction of the project, identify any issues, and get useful suggestions for improvement. Maintain focus on the expected results and encourage continuous feedback to improve the ongoing project.

At the end of the process, groups will participate in a **final presentation**, where they will showcase their completed projects. This step ensures that the planning phase is fully integrated with a conclusive evaluation moment, allowing participants to present their work, gather comprehensive feedback, and reflect on the outcomes of their efforts.

3.3 Final Presentation

Presentations: Groups will finalize and present their projects at the end of the camp. After all presentations, a guided discussion will take place to share observations and feedback.

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Objective: The objective of the final presentations and the final group comparison is to:

- Share and reflect on the proposed solutions, allowing groups to compare and learn from different approaches.
- Receive constructive feedback to improve projects, highlighting strengths and weaknesses.
- Stimulate mutual learning, allowing participants to take ideas from others' experiences.
- Verify the applicability of the solutions, ensuring that ideas are practical and valid.
- Strengthen teamwork, improving collaborative skills and feedback management.

In this way, the final comparison helps to improve the projects and fosters the professional and personal growth of the participants.

4. Expected Results

Building on the insights and feedback from the **Final Presentation**, participants will leave the camp with a deeper understanding of the STEAM approach and soft skills. The concluding phase serves as a reflection point, ensuring that each group can validate the applicability and quality of their proposed solutions. The outcomes include:

- **Complete STEAM projects**: each group delivers a structured activity ready for implementation, with a particular focus on the selected soft skills.
- **Progressive learning**: thanks to the checkpoints and feedback, participants improve the quality of their work and develop greater awareness of their capabilities.
- **Collaboration and soft skills**: the iterative team process strengthens soft skills.

5. Camp Results and Feedback

Survey Results

The following evaluation indicators were used to assess the camp experience. Participants rated each aspect on a scale from 1 (very negative) to 5 (very positive).

- **Organization**: Measures how effectively the camp was planned and executed, focusing on the clarity of the structure, coordination of activities, and overall logistics.
- **Relevance of Content**: Assesses how well the camp's topics and activities aligned with participants' professional needs and daily work, emphasizing practical applicability.
- **Personal Interest**: Reflects participants' engagement and motivation toward the camp's content, highlighting how interesting and meaningful they found the topics.

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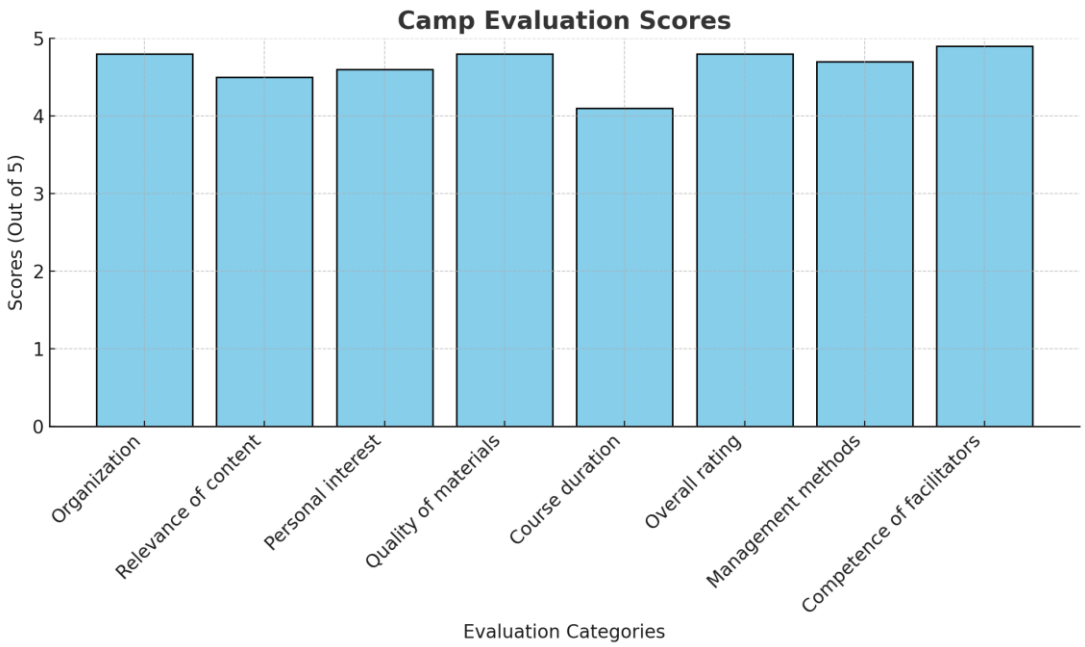
- **Quality of Materials**: Evaluates the usefulness, clarity, and attractiveness of the materials and resources provided to support the camp's activities.
- **Course Duration**: Indicates whether the time allocated for activities and the overall schedule were appropriate and balanced.
- **Overall Rating**: Summarizes participants' satisfaction with the camp experience, considering all aspects such as content, organization, and execution.
- **Management Methods**: Focuses on the effectiveness and appeal of the methodologies used to deliver and manage the camp.
- **Competence of Facilitators**: Highlights the expertise, engagement, and ability of the facilitators to guide and support participants effectively throughout the camp.

The average score for each section is detailed in the graph below:



Observations: The results show a high level of overall satisfaction, with particularly high scores for facilitator competence and organizational quality. The aspects least rated were the course duration and intensity, which suggest a potential area for improvement. Specifically, the participants found 8 hours of course a day too intense.

General Evaluations

- **Organization and preparation**: 71.43% of participants gave a score of 4 or 5, highlighting clear organization and well-planned activities.
- **Relevance of content for daily work**: 64.29% found the content very useful (score 4 or 5).

Identified Strengths

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- **Soft skills activities**: The rotation through the stations was one of the most appreciated activities.
- **Collaboration and idea exchange**: Participants valued group work and interaction with colleagues from different educational contexts, as reflected in the feedback from open-ended questions.
- **Materials and content**: The visual quality and practical utility of the materials were praised, with many participants mentioning them as key strengths in their responses.

Criticisms and Suggestions

- **Duration**: Some found the camp too intense.
- **Level of difficulty**: Some challenges were perceived as complex for less experienced participants.
- **Variety of activities**: Suggestions were made to include more short and practical activities to maintain high energy levels.

6. Projects Developed by Participants

All participants chose the challenge **"Hackathon: Innovative Solutions for Recycling,"** which is detailed in the attached **STEAM Challenges** document and summarized below.

Hackathon: Innovative Solutions for Recycling
A waste management company launched a recycling awareness campaign that did not achieve the desired results. To improve its effectiveness, the company decided to involve high school students in developing innovative solutions to increase recycling rates and raise awareness in the community. Organized into multidisciplinary teams, the students were challenged to come up with ideas to improve waste sorting and reduce the environmental impact of waste.

First Group: Green Squad Skills - The Future of Recycling

Main activities: This group divided the project into two main phases: organizing mini-hackathons at the class and school level, culminating in a regional hackathon. Practical activities included creating awareness videos for the community.

Strengths:

- Well-integrated **STEAM** approach with community involvement and field activities.
- Originality in addressing the "rare earth" elements issue, which is a crucial yet under-discussed topic.

Weaknesses:

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- Risk of reducing the "Art" component of the STEAM approach to purely aesthetic aspects.

Suggestions:

- Add a background story, such as a dystopian future: what would happen if we continue with the current model? And how could things change by applying student proposed solutions?
- Include fixed installations displaying data collected from the community to enhance visual and cognitive impact.

Second Group: Hackathon - Innovative Solutions for Recycling

Main activities: This group adopted a more immediate and practical approach, focusing on creating prototypes during the hackathon. They also integrated a strong social media component, involving influencers and platforms like TikTok and Instagram to promote a "recycling challenge."

Strengths:

- The idea of creating awareness videos was particularly effective and engaging.
- Practical prizes like a home composting machine and a camera encouraged participation.

Weaknesses:

- The videos could benefit from better narrative and technical quality.

Suggestions:

- Offer acting lessons or workshops with directors and video production experts to improve the content and message conveyed.
- Use catchy hashtags like **#nowastechallenge** or **#nowastestreak** (inspired by the Duolingo model) to drive engagement on social media.

Third Group: Recycling Is Your Future

Main activities: This group focused on data collection and analysis, organizing events such as a *Clean Up Day* and surveys to raise community awareness. They also used reverse psychology to engage students, sparking debate on topics like “Why keep recycling if nothing changes?”

Strengths:

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- Originality in proposing the role of "eco-detectives" to make the theme more engaging.
- Artistic critique of sculptures made from trash to stimulate deeper reflections.

Weaknesses:

- Some ideas risk being too similar to existing initiatives, potentially lacking originality.

Suggestions:

- Integrate a visual campaign highlighting historical data, such as: “In the 1970s, recycling was at 7%. Today, it’s at 32%, but it’s not enough.”
- Promote a creative contest: participants could propose and vote for recycling-themed T-shirt designs.

Final Comparison Between the Groups

Even tough all groups chose a common challenge, the results allowed them to compare directly between peers, sharing ideas and points of view. The final comparison between the groups was useful for sharing ideas, receiving constructive feedback, and identifying areas for improvement. It promoted collaboration and mutual learning, allowing each group to refine their activities based on the feedback received.

7. Appendix

Documents used in the STEAM Training Camp

- *[TrainingCamp] STEAM Approach*
- *Challenge-Template_final*
- *Creativity_Theories*
- *STEAM Challenges t*
- *Train the trainers SLIDES_1*

Documents used for the 3 Stations Activity

- *3 Stations PPT_STEAM Boss 2*
- *Crisis Management Simulation Game Cards*
- *Crisis Management Simulation Games_conflict management*
- *GROW Model_proactivity*
- *Kanban*
- *STAR Matrix_proactivity*
- *STEAM_3 Station Poster*
- *The Eisenhower Matrix*
- *The MoSCoW method*
- *Thomas-Kilmann Matrix_conflict management*

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Projects Developed by Participants

- *Green Squad Skills - The Future of Recycling*
- *Hackathon - Innovative Solutions for Recycling*
- *Recycling is your future*

Camp Program

- *PosterTrainerCamp_Agenda*

Survey and Pre/Post Camp Results

- *Survey_Pre-Post_MOOC-camp*
- *Survey_248672_STEAM-BoSS_Satisfaction-survey-3*
- *STEAMBOSS_training_camp_satisfaction*