



Guidelines for facilitating the learning of STEAME

Reference Number: 101102619

Module and Workshop Learning Plan

Module Number and Area/Topic: INTERACTIVE STEAME PROCESS

Module/workshop 5. Area 2: Motivation and Facilitation of the Learning Process

Module leaders: UALG (PORTUGAL)

1. Introduction and broad description of the context and goal of the area/topic addressed with reference to the STEAME Teacher Facilitators Competence Framework for student and serving teachers

The Interactive STEAME (Science, Technology, Engineering, Arts, Mathematics, and Entrepreneurship) process encompasses not only active engagement in learning but also the organisation and participation in various events such as fairs, competitions, workshops, and conferences. These events serve as platforms for students to showcase their projects, exchange ideas, and collaborate with peers and experts from diverse backgrounds.

Science fairs provide students with the opportunity to present their research and experiments, receive feedback, and engage in dialogue with judges and fellow participants, fostering a culture of inquiry and discovery. Competitions in STEAME fields challenge students to apply their knowledge and skills in creative ways to solve real-world problems. Whether it's robotics competitions, coding hackathons, or engineering challenges, these events encourage collaboration, innovation, and perseverance as students work towards finding solutions. Workshops and conferences offer students the chance to explore new topics, learn from industry professionals, and participate in hands-on activities that deepen their understanding of STEAME concepts. By actively participating in event organization and attendance, students develop leadership skills, teamwork abilities, and a passion for lifelong learning that extends beyond the classroom. Overall, the Interactive STEAME process nurtures a culture of exploration, collaboration, and innovation that prepares students to thrive in an ever-evolving world.

The primary objective is to teach students how to plan and execute an event successfully. Additionally, students will learn about various topics related to event management, such as effective communication, sustainability, quality evaluation, and learning from mistakes and best practices. Through this process, it is expected that students will also develop essential transversal competencies.

2. Learning objectives and learning outcomes with reference to the defined list of learning outcomes in the Competence framework

For student teachers:

- LO #6. Design Learning and Creativity plans to facilitate students' PBL in and across two or more STEAME subjects.
- LO #7. Propose meaningful and authentic contexts that do not have a single solution to be addressed through STEAME PBL in the classroom.

- LO #8. Explain the importance of defining and communicating the starting point and expected result or product of learning (portfolio, blog, video, poster, service, game...) in STEAME PBL learning activities.
- LO #9. Identify teaching and learning strategies that engage students in interdisciplinary practices (act like scientists / artists / engineers / entrepreneurs...) as part of STEAME PBL
- LO #10. List strategies to manage student learning in STEAME PBL activities that allow providing support or scaffolding based on students' progress.
- LO #11. Understand the need to share or agree on a set of students' assessment criteria for STEAME PBL learning activities beforehand.
- LO #12. Define a productive use of up-to-date technologies to facilitate student learning in STEAME PBL learning activities, including artificial intelligence, virtual and hybrid learning environments.
- LO #13. Select and adapt digital content to support micro-learning, such as instructional videos and infographics.
- LO #14. Plan STEAME PBL teaching and learning activities that balance students' individual and group work.
- LO #15. Develop awareness about the need to create a classroom climate that favours self-guided learning, asking questions, sharing, coaching, and empathy.

For service teachers:

- LO #6. Use Learning and Creativity plans to facilitate students' PBL in and across two or more STEAME subjects in a particular school.
- LO #7. Propose meaningful and authentic contexts that do not have a single solution to be addressed through STEAME PBL with a particular group or groups of students.
- LO #8. Practise defining and communicating the starting point and expected product of learning (portfolio, blog, video, poster, service, game...) in STEAME PBL learning activities.
- LO #9. Identify teaching and learning strategies that engage a specific group of students in interdisciplinary practices (act like scientists/artists/engineers/entrepreneurs...) as part of STEAME PBL.
- LO #10. Makeup strategies to manage student learning in STEAME PBL activities that allow providing support or scaffolding based on students' progress.
- LO #11. Propose ways to share or agree on the assessment criteria of STEAME PBL learning activities beforehand with students.
- LO #12. Demonstrate a productive use of up-to-date technologies to facilitate student learning in STEAME PBL learning activities, including artificial intelligence, virtual and hybrid learning environments.
- LO #13. Create, modify and/or appropriately share digital content to support micro-learning, such as instructional videos and infographics.
- LO #14. Plan STEAME PBL teaching and learning activities that balance students' individual and group work for a specific group or groups of students.
- LO #15. Explain how to create a classroom climate that favours self-guided learning, asking questions, sharing, coaching, and empathy in a specific teaching and learning context.

3. Competences that are developed

The module on event organization within the context of STEAME PBL (Project-Based Learning) fosters the development of various competences among teachers, enabling them to effectively facilitate STEAME-based events and projects. Here are some key competences that are developed through this module:

1. **Interdisciplinary Integration:** Teachers learn to integrate multiple disciplines seamlessly into event planning and project-based learning activities. They develop the ability to identify connections between different subject areas and leverage them to create holistic learning experiences for students.
2. **Project Management Skills:** Teachers gain proficiency in project management skills, including setting goals, creating timelines, allocating resources, and managing stakeholders. They learn how to effectively plan, organize, and execute STEAME events and projects within specified constraints.
3. **Inquiry-Based Learning:** Teachers become adept at facilitating inquiry-based learning experiences where students are encouraged to ask questions, explore solutions, and engage in critical thinking. They learn how to foster a culture of curiosity and experimentation that promotes active learning and problem-solving.
4. **Collaborative Leadership:** Teachers develop collaborative leadership skills as they work with colleagues, students, parents, and community partners to organize STEAME events and projects. They learn how to build and sustain collaborative relationships, delegate tasks, and empower others to contribute to shared goals.
5. **Creative Problem-Solving:** Teachers cultivate creative problem-solving skills as they navigate the complexities of event organization and project-based learning. They learn how to think innovatively, adapt to changing circumstances, and find creative solutions to challenges that arise during the planning and implementation process.
6. **Technology Integration:** Teachers acquire proficiency in integrating technology tools and resources into STEAME events and projects. They learn how to leverage digital platforms, software applications, and multimedia resources to enhance learning experiences, facilitate collaboration, and showcase student work.
7. **Assessment and Evaluation:** Teachers develop skills in assessing and evaluating student learning outcomes within the context of STEAME events and projects. They learn how to design authentic assessment tasks, provide meaningful feedback, and measure student progress towards specified learning objectives.

Overall, the module on event organization in STEAME PBL equips teachers with a diverse range of competences that are essential for designing, facilitating, and assessing engaging and impactful learning experiences that promote STEAME integration, collaboration, communication, creativity, critical thinking, problem-solving, time management, leadership, responsibility, self-direction, and work ethic among students.

Incorporating Competence 4, which emphasizes embedding learning in meaningful and authentic STEAME projects, alongside Competence 5, which guides student learning within these projects, and complemented by Competence 6, which ensures the provision of the right learning climate, ensures holistic development and effective implementation of the STEAME teachers competence framework.

4. Content and Resources (providing information on the various constituents/ dimensions of the topic under consideration), including presenter's notes for guidelines of the workshop organisation

A workshop aims to equip educators with the knowledge, skills, and resources necessary for organizing successful STEAME events such as fairs, competitions, workshops, and conferences. Participants will explore the various constituents and dimensions of event organization within the context of STEAME PBL, including planning, implementation, and assessment strategies. Through interactive discussions, hands-on activities, and practical examples, educators will gain insights into effective workshop organization and learn how to create engaging and impactful learning experiences for students (competences for students). The most important presenter's notes are:

1. Introduction to Interactive STEAME Process (10 minutes)

- Welcome participants and introduce the workshop objectives.
- Explain the importance of the Interactive STEAME Process in promoting interdisciplinary learning and fostering 21st-century skills.
- Provide an overview of the workshop agenda.

2. Understanding STEAME Integration (10 minutes)

- Define STEAME and emphasize the importance of integrating events organization.
- Discuss the benefits of integrating events organization for student learning and skill development.
- Share examples of STEAME events and their impact on student engagement and achievement.

3. Planning STEAME Events (10 minutes)

- Explore the key components of event planning, including setting goals, defining objectives, and establishing timelines.
- Discuss strategies for selecting event themes, formats, and activities that align with STEAME principles.
- Provide participants with resources for generating event ideas and developing event proposals.

4. Implementing STEAME Events (20 minutes)

- Review best practices for implementing STEAME events, including logistics management, resource allocation, and participant recruitment.
- Discuss the role of technology in enhancing event experiences and facilitating collaboration among participants.
- Share tips for creating inclusive and accessible event environments that cater to diverse learners.

5. Workshop Organization Guidelines (60 minutes)

- Provide guidelines for organizing STEAME workshops, including setting clear objectives, structuring agendas, and selecting appropriate activities.
- Discuss strategies for promoting participant engagement, collaboration, and reflection throughout the workshop.
- Encourage participants to share their ideas and insights for organizing STEAME events in their educational contexts.

6. Assessing STEAME Events (20 minutes)

- Explore different approaches to assessing student learning outcomes in STEAME events, such as rubrics, portfolios, and peer evaluations.
- Discuss the importance of providing timely and constructive feedback to students to support their ongoing growth and development.
- Share examples of assessment tools and resources that educators can use to evaluate student performance effectively.

7. Questions&Answers and Closing (20 minutes)

- Open the floor for questions and comments from participants.
- Summarize key takeaways from the workshop and reiterate the importance of STEAME events in enhancing student learning and achievement.

- Thank participants for their participation and encourage them to apply what they've learned in their teaching practices.

5. Methodology and approaches for the module training presentation and guidelines for workshop organisation

The applied methodology proposes a comprehensive approach that amalgamates teacher-centred techniques with guided exploration, utilizing authentic problems as the catalyst for inquiry-based learning. The key features of the proposed methodology are:

1. Participant-centred approach.
2. Tutor as a facilitator or guide.
3. Participants work in small groups with the guidance of a tutor (exploratory research as a case study).
4. Problem as a tool to achieve the required knowledge and skills necessary to solve the problems.
5. Begin with authentic and ill-structured problems as the driving force for enquiry.
6. Information acquired through self-directed learning.

To effectively deliver a module training presentation on event organization within the context of STEAME PBL, it's essential to incorporate a combination of methodologies and approaches that engage participants and provide practical guidelines for organizing successful events. Here's a structured outline for such a presentation:

Methodology:

1. **Interactive Lectures:** present key concepts and principles of event organization, emphasizing the importance of STEAME integration and PBL.
2. **Case Studies:** present case studies of successful STEAME events, including fairs, competitions, workshops, and conferences. Analyze the strategies used, challenges faced, and lessons learned, providing participants with practical insights and inspiration.
3. **Hands-on Activities:** activities that simulate event planning processes, such as brainstorming sessions for event ideas, creating event timelines, budgeting exercises, and designing promotional materials. Encourage participants to work in groups to foster collaboration and creativity.
4. **Guest Speakers:** invite guest speakers who have experience organizing STEAME events to share their expertise and best practices. Their real-world insights can enrich the learning experience and offer valuable advice to participants.

Approaches:

1. **Multidisciplinary Integration:** showcase how event organization inherently involves the integration with PBL. Discuss how STEAME principles can be applied at each stage of event planning, from conceptualization to execution, to create engaging and impactful experiences.
2. **Inquiry-Based Learning:** Encourage participants to ask questions, explore different approaches, and seek solutions collaboratively. Foster an environment of inquiry-based learning where participants actively engage with the material and apply their knowledge to solve real-world challenges.
3. **Reflection and Feedback:** incorporate opportunities for reflection and feedback throughout the presentation. Encourage participants to reflect on their learning, identify areas for improvement, and provide constructive feedback to their peers. This reflective practice enhances the learning process and promotes continuous improvement.

Guidelines for Workshop Organization:

1. **Clear Objectives:** outline what participants will learn and achieve by the end of the session.
2. **Structured Agenda:** includes key topics, and activities with sufficient time for each segment while allowing flexibility for participant engagement and discussion.
3. **Engaging Materials:** such as presentation slides, handouts, and interactive resources to support learning and facilitate activities.
4. **Facilitator Guidance:** clear guidance on their roles and responsibilities, including how to facilitate activities, encourage participation, and manage group dynamics.
5. **Participant Interaction:** create opportunities for participant interaction and collaboration, such as group discussions, breakout sessions, and peer learning activities.
6. **Feedback Mechanism:** gather participant feedback on the workshop content, delivery, and overall experience. Use this feedback to make improvements for future workshops.

By incorporating these methodologies, approaches, and guidelines, the module training presentation on event organization within the context of STEAME PBL can effectively equip participants with the knowledge, skills, and confidence to organize successful STEAME events that inspire creativity, innovation, and lifelong learning.

6. Instruments/Tools/Supporting Materials/Resources to be used

Digital whiteboard platform (optional), paper A4 and A3, post-its, markers, PowerPoint presentation, worksheets, videos, webpages links.

PART 1	Introductory Activities (creation of interest, reference to real-world issues, relation to background and experiences, etc.)
Learning Objectives	1. Understand the Basics of Event Planning 2. Integrate STEAME PBL Concepts
Learning Outcomes	Teachers enhance their understanding of interdisciplinary integration of event planning within STEAME PBL
Competences	1. Reflection skills 2. Interdisciplinary collaboration to organize an event
Content, Resources and Tools	Paper, markers, tape, post-it notes
Activities	1. Introduction to event organizations and PBL: introduce the concept of an event organization and explain how it fits into the broader framework of Project-Based Learning (PBL). 2. Icebreaker Activity: Begin with an icebreaker activity to get teachers comfortable and engaged. This could be a simple game or a quick discussion about their favourite STEAME-related topics. By engaging teachers in this introductory activity, you can set a positive tone for the event organization process, promote teamwork, and spark excitement about STEAME PBL.
Estimated Time	20 minutes

PART 2	Development Activities
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Learning Objectives	1. Understand event management principles. 2. Identify and apply event organisation principles in STEAME PBL. 3. Demonstrate interdisciplinary understanding and proficiency in project management within a real-world context. 4. Discuss and reflect on the value of experiential learning through events in PBL.
Learning Outcomes	1. Reinforce understanding of different types of events in PBL. 2. Recognize the connection between event organization and PBL objectives.
Competences	1. Understand the principles of Project management. budgeting, scheduling, and logistics management. 2. Engagement with the community and collaboration with peers to share insights and resources related to interactive STEAME PBL.
Content, Resources and Tools	Digital whiteboard platform (optional) Paper A3, post-its, markers, PowerPoint presentation, Videos, Webpages links
Activities	1. Brainstorming Session: Divide teachers into small groups, ideally diverse in skills and interests. Provide each group with a large piece of paper or a digital whiteboard platform. 2. Prompt for Brainstorming: Give them a prompt related to potential science fair project ideas. For example, "How can an event about STEAME PBL be used to present, discuss and show solutions for a problem in your community?" Encourage them to think creatively and consider various angles. 3. Guidelines and Constraints: Provide any necessary guidelines or constraints for their brainstorming process. For instance, emphasize the importance of feasibility, relevance to real-world issues, and adherence to scientific principles. 4. Brainstorming Time: Allow the groups ample time to brainstorm ideas. Circulate among the groups to offer guidance, answer questions, and encourage collaboration. 5. Presentation Preparation: After the brainstorming session, give each group an opportunity to choose one idea from their list and prepare a brief presentation. They should outline the problem they want to address, their proposed solution, and how they plan to implement it. 6. Presentations: Have each group present their chosen project idea to the class. Encourage other groups to ask questions and provide feedback. 7. Reflection and Discussion: Conclude the activity with a reflection session. Ask teachers to share their thoughts on the brainstorming process, what they learned, and any challenges they encountered.
Estimated Time	30 minutes

Learning Objectives	1. Develop Collaboration Skills 2. Apply Design Thinking Principles 3. Practice Project Management Skills 4. Cultivate Entrepreneurial Mindset 5. Enhance Presentation and Communication Skills 6. Promote Creativity and Innovation
Learning Outcomes	Teachers will gain proficiency in facilitating interdisciplinary collaboration among students, fostering an environment that encourages creative problem-solving and innovation, and developing strategies for assessing and providing feedback on students' event planning projects within a STEAME PBL context.
Competences	Mentor and guide in activities related to event organization, plan and organise events to present or implement projects.
Content, Resources and Tools	Paper A3, post-its, markers, Powerpoint presentation, Videos, Webpages links
Activities	1. In this activity, teachers will work in teams to plan and organize a fictional event within a limited timeframe. The event could be a science fair, technology expo, engineering competition, art showcase, math challenge, or entrepreneurship summit, encompassing elements of STEAME education. 2. Each team will be tasked with creating an event proposal and presentation to showcase their planning process and ideas: 3. Define objective and budget. 4. Plan the event (format, target audience, date and location, schedule, infrastructure). 5. Define a work team. 6. Choose partners. 7. Publicise the event. 8. Create an event organisation checklist. 9. Finding essential technology in organising events. 10. Learn metrics to evaluate events. 11. Practice Communication skills.
Estimated Time	60 minutes

PART 4	Evaluation of Learning Outcomes
Learning Objectives	1. Capacity to assess event success. 2. Reflect on the learning process. 3. Analyse stakeholder feedback. 4. Evaluate project management skills. 5. Demonstrate critical thinking. 6. Communicate findings. 7. Apply feedback for improvement. 8. Promote continuous learning and professionalism.

Learning Outcomes	Reason and assess the extent to which the various components of an implemented Interactive STEAME Process module (learning goals/objectives, activities, driving question, etc.) meet the learning objective mentioned above.
Competences	Understand and apply the event organization framework within STEAME PBL and the overall structure of the “Interactive STEAME Process” module.
Content, Resources and Tools	Example of an event organization related with one or more real STEAME Projects. Evaluation Rubric
Activities	The participants receive examples of events organized during STEAME projects. After analysing the project and the organized event, they evaluate the events according to the various criteria of an assessment rubric.
Estimated Time	20 minutes

7. Reflection and Closure activity

The Reflection and Closure activity not only allows teachers to showcase their activities and receive feedback but also provides a structured opportunity for them to reflect on their experiences, consolidate their learning, and celebrate their achievements in event organization within a STEAME PBL context:

1. **Reflection Discussion:** start asking open-ended questions to prompt reflection, such as:
 - What was the most challenging aspect of planning your small event, and how did you overcome it?
 - What STEAME concepts did you incorporate into your event, and how did they enhance the experience?
 - What did you learn about event organization and teamwork through this experience?
 - What would you do differently if you could redo this small project?
2. **Sharing Insights:** invite teachers to share their observations and discuss the strengths and areas for improvement they noticed in their peers' projects. Encourage constructive feedback and celebrate successes.
3. **Personal Reflection:** Provide time for individual reflection, either through journaling or group discussion.
4. **Closure and Appreciation:** Conclude the reflection session by expressing appreciation for teachers' work and creativity throughout the workshop. Emphasize the value of reflection in deepening learning.