



## **Guidelines for facilitating the learning of STEAME**

Reference Number: 101102619

### **Module and Workshop Learning Plan**

**Module Number and Area/Topic:** Project-Based Learning (PBL) for Teachers

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### **Nd 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**

This training module is designed to enhance educators' understanding and proficiency in Project Based Learning (PBL), equipping them with the necessary knowledge and skills to effectively create, implement, and evaluate Project-Based Learning activities in their classrooms. Throughout this module, educators will delve into the core principles of PBL and explore pedagogical approaches aimed at designing tasks that promote deeper student engagement and improve learning outcomes. Special attention will be given to Inquiry Based Learning (IBL), Problem Solving Based Learning (PSL), and Context Based Learning (CBL), as well as fostering cooperation, collaboration, reasoning, and creativity.

This course will be highly interactive and practical, structured as a PBL simulation where participants will collaborate in small groups to navigate through the various stages of a PBL project. Additionally, it will offer tangible examples, ideas, and tools to inspire and assist educators in planning their own PBL units.

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

#### **Learning objectives**

The course will help the participants to:

1. Understand what PBL really is, as well as the key principles and benefits of Project-Based Learning
2. Discover the structure and the main key-components and characteristics of PBL
3. Discover the main pedagogical approaches included in PBL, such as the Inquiry Based Learning (IBL), the Problem-Solving Based Learning (PSL), and the Context Based Learning (CBL) and identify their characteristics and key-elements
4. Identify the characteristics of a PBL activity
5. Identify the characteristics of a good driving question for a PBL unit
6. Gain familiarity with the incorporation of curriculum topics from any discipline into PBL

#### **Learning outcomes**

1. Recognize the differences among Projects and Project Based Learning
2. Define and list the main characteristics of Project Based Learning (PBL) and point out its structure (design, implement and assess) as well as its advantages in teaching and learning

3. List the key elements of the Inquiry Based Learning (IBL), the Problem-Solving Based Learning (PSL), and the Context Based Learning (CBL) and point out their advantages in teaching and learning
4. Put preliminary research ideas into testable driving questions for a PBL unit
5. Point out or make connections among disciplines of study
6. Distinguish PBL activities based on specific criteria
7. Exchange good practices and discuss challenges with fellow colleagues and the course trainers

### **3. Competences that are developed**

- Discriminate projects from PBL
- Gain familiarity with Problem Based Learning (PBL), Inquiry Based Learning (IBL), Problem-Solving Based Learning (PSL), and Context Based Learning (CBL)
- Formulate the driving-question for a PBL unit
- Collaboration and communication with other teachers
- Experiences in interdisciplinary learning
- Ability to guide students in the acquisition of knowledge and life skills by linking curriculum topics to real-life situations
- Familiarity with motivating students through teamwork, creative learning and inquiry-based learning.
- Reflect on their regular instruction and their role in students teaching and learning
- Think creatively and develop PBL activities

### **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's organisation**

#### **Content**

- "Definition" of PBL
- Pedagogical Knowledge and Pedagogical Content Knowledge: Pedagogical approaches involved in PBL (IBL, PSL, CBL)
- Concrete examples of PBL units and activities that present the key-elements needed for an effective design of a PBL unit (driving question, specific goals and objectives, strategies, methods, etc.)
- Ppt presentation, videos, webpages links, etc

### **5. Methodology and approaches for the module training presentation and guidelines for workshops organisation**

Active, interactive and collaborative learning, brainstorming, investigation (inquiry-based learning) group work, hands-on activities, building artifacts (concept map)

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

Videos, Urls, paper, markers, ppt presentation, woksheets

<b>PART 1</b>	<b>Introductory Activities (creation of interest, reference to real-world issues, relation to background and experiences, etc.)</b>
<b>Learning Objectives</b>	Highlight the participants' needs and previous experience about PBL
<b>Learning Outcomes</b>	Teachers reflect on their on their instruction and previous experience about PBL and identify and determine their related needs
<b>Competences</b>	Reflection skills
<b>Content, Resources and Tools</b>	Paper, markers, tape, post-it notes
<b>Activities</b>	<p><b>Ice-Raise breaking activity: "ABCs of Me"</b></p> <ol style="list-style-type: none"> <li>1. The participants write their name vertically down the left side of a piece of paper. Then, they choose a word that starts with each letter of their name. These words should describe something about them. They write these words horizontally across the paper, using the letters of their name as the first letter of each described word and an accompanying picture to illustrate each word. When posters are completed, the participants introduce themselves using their name drawings.</li> <li>2. <u>Group-work:</u> Teachers study examples of PBL and write on post-it notes some words that express their expectations of the training module and their needs about PBL. These notes are then laid out on a two-column A3 paper (first column represents expectations and second column educational needs). This activity will be discussed at the end of the unit since it serves as an evaluation tool for the module. Participants will report the extent to which each of their expectations was met or their needs covered.</li> </ol>
<b>Estimated Time</b>	<b>15 minutes</b>

*(add more Activity sections as needed)*

<b>PART 2</b>	<b>Development Activities</b>
<b>Learning Objectives</b>	<ol style="list-style-type: none"> <li>1. Understand what PBL really is, as well as the key principles and benefits of Project-Based Learning</li> <li>2. Discover the main components and characteristics of PBL</li> </ol>
<b>Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Recognize the differences among Projects and Project Based Learning</li> <li>2. Develop a Concept map about PBL</li> </ol>
<b>Competences</b>	<ol style="list-style-type: none"> <li>1. Discriminate projects from PBL</li> <li>2. Understand the principles, the key components and the pedagogy of Project-Based Learning</li> <li>3. Engagement in professional learning communities and collaboration with peers to share insights and resources related to PBL.</li> </ol>
<b>Content, Resources and Tools</b>	Paper A3, post-its, markers, Ppt presentation, videos, webpages links

	<ol style="list-style-type: none"> <li>1. <a href="https://kappanonline.org/preparing-teachers-project-based-teaching-grossman-pupik-dean-kavanagh-herrmann/">https://kappanonline.org/preparing-teachers-project-based-teaching-grossman-pupik-dean-kavanagh-herrmann/</a></li> <li>2. <a href="https://www.edtechreview.in/trends-insights/insights/the-difference-between-projects-and-pbl-project-based-learning/">https://www.edtechreview.in/trends-insights/insights/the-difference-between-projects-and-pbl-project-based-learning/</a></li> <li>3. <a href="https://www.graduateprogram.org/2019/12/projects-and-project-based-learning-whats-the-difference/">https://www.graduateprogram.org/2019/12/projects-and-project-based-learning-whats-the-difference/</a></li> <li>4. <a href="https://www.pblworks.org/doing-project-vs-project-based-learning">https://www.pblworks.org/doing-project-vs-project-based-learning</a></li> <li>5. <a href="https://www.pblworks.org/what-is-pbl">https://www.pblworks.org/what-is-pbl</a></li> <li>6. <a href="https://www.smartlablearning.com/project-based-learning-examples/">https://www.smartlablearning.com/project-based-learning-examples/</a></li> <li>7. <a href="https://www.smartlablearning.com/project-based-learning-in-high-school/">https://www.smartlablearning.com/project-based-learning-in-high-school/</a></li> <li>8. <a href="https://www.teacheracademy.eu/blog/project-based-learning/">https://www.teacheracademy.eu/blog/project-based-learning/</a></li> <li>9. <a href="https://www.teachthought.com/project-based-learning/difference-between-doing-projects-and-pbl/#:~:text='Projects'%20can%20represent%20a%20range,than%20the%20end%2Dproduct%20itself.">https://www.teachthought.com/project-based-learning/difference-between-doing-projects-and-pbl/#:~:text='Projects'%20can%20represent%20a%20range,than%20the%20end%2Dproduct%20itself.</a></li> <li>10. <a href="https://www.teachthought.com/project-based-learning/difference-between-doing-projects-and-pbl/">https://www.teachthought.com/project-based-learning/difference-between-doing-projects-and-pbl/</a></li> <li>11. <a href="https://www.youtube.com/watch?v=dhwuQU2-g5g">https://www.youtube.com/watch?v=dhwuQU2-g5g</a></li> <li>12. <a href="https://www.youtube.com/watch?v=H7LHsL0iB_w">https://www.youtube.com/watch?v=H7LHsL0iB_w</a></li> </ol>
<b>Activities</b>	<p><b>PBL: Introduction</b></p> <ol style="list-style-type: none"> <li>1. <u>Brainstorming Group Work Activity:</u> Participants engage in a brainstorming session focused on Problem-Based Learning (PBL), jotting down their thoughts on Post-it notes. These notes are then laid out randomly on an A3 paper. Subsequently, participants group similar notes together and assign names to these clusters. They proceed to arrange these groups into a coherent flow, experimenting with different arrangements to construct a concept map outlining the key aspects of PBL.</li> <li>2. <u>Information Gathering and Concept Map Refinement:</u> Participants watch a video about PBL or search for information about PBL using various sources such as URLs, etc. They then revisit and refine their concept maps based on the newly acquired information, engaging in reflection and self-assessment activities.</li> <li>3. <u>Defining PBL:</u> Based on the information collected, participants write a definition for PBL</li> <li>4. <u>Concept Map Presentation and Discussion:</u> Participants present their finalized concept maps to the entire class, engaging in argumentation and discussion to further explore and clarify the ideas presented.</li> </ol>
<b>Estimated Time</b>	20 minutes

*(add more Activity sections as needed)*

PART 3	Practical Activities (hands-on activity) in the case of a workshop mode
<b>Learning Objectives</b>	<ol style="list-style-type: none"> <li>1. Discover the main pedagogical approaches included in PBL, such as the Inquiry Based Learning (IBL), the Problem-Solving Based Learning (PSL), and the Context Based Learning (CBL) and identify their characteristics and key-elements</li> <li>2. Identify the characteristics of a PBL activity</li> <li>3. Identify the characteristics of a good driving question for a PBL unit</li> <li>4. Gain familiarity with the incorporation of curriculum topics from any discipline into PBL</li> </ol>
<b>Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. List the key elements of the Inquiry Based Learning (IBL), the Problem-Solving Based Learning (PSL), and the Context Based Learning (CBL) and point out their advantages in teaching and learning</li> <li>2. Put preliminary research ideas into testable driving questions for a PBL unit</li> <li>3. Point out or make connections among disciplines of study</li> <li>4. Distinguish PBL activities based on specific criteria</li> <li>5. Exchange good practices and discuss challenges with fellow colleagues and the course trainers</li> </ol>
<b>Competences</b>	<ol style="list-style-type: none"> <li>1. Gain familiarity with Problem Based Learning (PBL), Inquiry Based Learning (IBL), Problem-Solving Based Learning (PSL), and Context Based Learning (CBL)</li> <li>2. Skill in crafting engaging driving questions to drive inquiry in a PBL unit</li> <li>3. Experiences in interdisciplinary learning</li> <li>4. Ability to guide students in the acquisition of knowledge and life skills by linking curriculum topics to real-life situations</li> <li>5. Familiarity with motivating students through teamwork, creative learning and inquiry-based learning.</li> <li>6. Reflect on their regular instruction and their role in students teaching and learning</li> <li>7. Think creatively and develop PBL activities</li> <li>8. Engagement in professional learning communities and communication and collaboration with peers to share insights and resources related to IBL, CBL, PSL.</li> </ol>
<b>Content, Resources and Tools</b>	<ul style="list-style-type: none"> <li>• <a href="https://www.splashlearn.com/blog/what-is-inquiry-based-learning-a-complete-overview/">https://www.splashlearn.com/blog/what-is-inquiry-based-learning-a-complete-overview/</a></li> <li>• <a href="https://www.queensu.ca/ctl/resources/instructional-strategies/inquiry-based-learning">https://www.queensu.ca/ctl/resources/instructional-strategies/inquiry-based-learning</a></li> <li>• <a href="https://www.education.gov.au/australian-curriculum/national-stem-education-resources-toolkit/i-want-know-about-stem-education/what-works-best-when-teaching-stem/inquiry-based-learning">https://www.education.gov.au/australian-curriculum/national-stem-education-resources-toolkit/i-want-know-about-stem-education/what-works-best-when-teaching-stem/inquiry-based-learning</a></li> <li>• <a href="https://www.prodigygame.com/main-en/blog/inquiry-based-learning-definition-benefits-strategies/">https://www.prodigygame.com/main-en/blog/inquiry-based-learning-definition-benefits-strategies/</a></li> </ul>

	<ul style="list-style-type: none"> <li>• <a href="https://www.hunschool.org/resources/problem-based-learning">https://www.hunschool.org/resources/problem-based-learning</a></li> <li>• <a href="https://www.structural-learning.com/post/problem-based-learning-a-teachers-guide">https://www.structural-learning.com/post/problem-based-learning-a-teachers-guide</a></li> <li>• chrome-extension://efaidnbnmnnibpcajpcglclefindmkaj/https://www.theeducationhub.org.nz/wp-content/uploads/2018/06/Problem-based-learning.pdf</li> <li>• <a href="https://www.learningbyinquiry.com/creating-strong-driving-questions-for-inquiry-learning/">https://www.learningbyinquiry.com/creating-strong-driving-questions-for-inquiry-learning/</a></li> <li>• <a href="https://education.nsw.gov.au/teaching-and-learning/curriculum/stem/early-stage-1-to-stage-3/project-based-learning-and-design-thinking/driving-question">https://education.nsw.gov.au/teaching-and-learning/curriculum/stem/early-stage-1-to-stage-3/project-based-learning-and-design-thinking/driving-question</a></li> <li>• chrome-extension://efaidnbnmnnibpcajpcglclefindmkaj/https://files.eric.ed.gov/fulltext/EJ938579.pdf</li> </ul>
<b>Activities</b>	<p>Group work activity</p> <p>Participants are provided with case studies of PBL implementations in real classrooms. After studying them, they are asked to analyze the case studies and identify the incorporated pedagogical approaches, effective practices, challenges encountered, and lessons learned. Additionally, they are asked to identify the criteria that are incorporated into the activities in order to be considered as PBL engagements, as well as the characteristics of the driving questions. Subsequently, each group notes down the approaches and their characteristics and present their work in plenary and discussed.</p>
<b>Estimated Time</b>	30 minutes

*(add more Activity sections as needed)*

<b>PART 4</b>	<b>Evaluation of Learning Outcomes</b>
<b>Learning Objectives</b>	<ol style="list-style-type: none"> <li>1. Point out the connections among disciplines of study in a PBL unit</li> <li>2. Appraisal PBL activities incorporated in a PBL unit based on specific criteria</li> </ol>
<b>Learning Outcomes</b>	Reason and assess the extent to which the various components of an implemented PBL unit (learning goals/objectives, activities, driving question, etc.) meet the specific criteria mentioned above
<b>Competences</b>	Familiarity with the structure of the PBL activities and the general structure of a PBL unit
<b>Content, Resources and Tools</b>	Learning and Creativity Plan of an implemented PBL unit, evaluation rubric

<b>Activities</b>	Participants are given a Learning and Creativity Plan of an implemented PBL unit and evaluate the extent to which the various components (learning goals/objectives, activities, driving question, etc.) meet specific criteria of an evaluation rubric
<b>Estimated Time</b>	5-10 minutes

*(add more Activity sections as needed)*

### **Reflection and Closure activity**

**“ABCs of Me” activity:** The participants report the extent to which each of their expectations or needs written at the beginning of the course was met or covered using a Liker type scale to 1-5 (1 is the minimum, 5 is the maximum)