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Overcoming uncertainty - Building bridges between society and learning in the future

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Workshop: How to Plan an Interdisciplinary Project-Based Learning (PBL) Approach

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Abstract

This workshop aims to support participants to be able to plan an interdisciplinary Project-Based Learning (PBL) approach, exploring several dimensions of PBL. The conceptual fundamentals, such as framing PBL in the Active Learning continuum, PBL principles, project typologies, and PBL models, will be briefly discussed, serving as a basis for the workshop. During the practical part of the workshop, the participants will experience a simulation of a project, working in teams to develop a plan for a specific PBL approach. At the end of the workshop, the participants will present a visual and simplified plan for their proposal in a gallery walk. After a short presentation of one specific example, at the end of the workshop, the participants would have clarified some of the main elements of PBL, leaving a seed that can be deepened. The activities were planned inductively, and carried out in teams, with three main parts: basic concepts (1); planning a PBL approach (2); examples and discussion (3).

Keywords: Active Learning; Engineering Education; Project-Based Learning.

1 Introduction

Active learning puts the student at the centre of meaningful teaching-learning processes, in which students should understand why they are developing the expected competences. Environments with high levels of *engagement* and motivation will shape these processes. Active learning also implies moments of students' reflection about what they are learning, how, what for and with whom (Bonwell & Eison, 1991; Prince et al., 2020; Prince & Felder, 2006). Some studies show that Active Learning works. For instance, Freeman et al. (2014) point out that active learning is effective for students' assessment performance and Theobald et al. (2020) found a significant effect on the reduction of the gap in the performance of underrepresented students. Thus, teacher training for active learning (Neves et al., 2021) may be conducted to improve students' performance and inclusion (Lima et al., 2024).

A significant number of Active Learning Approaches may be implemented and can be classified along a continuum of students' degree of autonomy (Lima et al., 2024). Some approaches demand less autonomy from students like Think-Pair-Share; others demand a higher level of autonomy, such as Project-Based Learning (PBL).

The Problem and Project-Based Learning are the most widely used active learning approaches in engineering courses (Edström & Kolmos, 2014; Lima et al., 2024). PBL may assume different typologies according to the needs, context and learning outcomes (Helle et al., 2006), namely the exercise of project, project course, interdisciplinary project and curriculum project.

This workshop aims to support participants in planning an interdisciplinary Project-Based Learning (PBL) approach, exploring different dimensions of PBL, for instance, the problem, topic or theme to be addressed by the project

This workshop was developed under the activities of an Erasmus+ project aiming at creating a PBL framework for Digital Collaborative Teacher Training (https://pbl4tea.idea.uminho.pt/), which was piloted in two international teacher training settings.

2 Activities

In this workshop the participants will experience, as learners, how to work in a PBL environment. At the end of the workshop participants will develop an introductory proposal of a PBL approach, based on the research evidence, principles and dimensions of Project Based Learning (PBL). Thus, the workshop is designed to be interactive, engaging and collaborative.

The main objective of the workshop will be to initiate teachers to the PBL process and leave a seed that can grow in their institutions. For this reason, we plan the activities inductively, and we will carry out an action with a high intensity of active and autonomous work with the following ingredients: discussion of basic PBL concepts; development of a PBL proposal based on a sustainability theme; cooperative work among teachers; shared discussion on possible points for improvement of the proposal.

This workshop will require teamwork of 5 to 8 participants, preferably developed in workspaces with tables suitable for working together on flip-chart sheets. The necessary material will be a video projector, flip chart sheets, post-its and markers of various colours for each team. In the final part of the workshop, it will be necessary to hang on the walls the proposals developed on flip-chart sheets, for the development of a presentation in a gallery walk format.

It is intended that the teachers involved develop competences for the design and basic planning of learning processes based on interdisciplinary projects. The workshop will focus on activities carried out by the participants themselves that aim to build and present a PBL learning project proposal according to the work developed, in which the participants, in groups, analyse, discuss and reflect on a collaborative process as a way to start and plan a project.

The workshop will be based on the following activities briefly described above:

- PBL principles (15 minutes)
- PBL planning with 4 milestones:
    - Requirements for PBL planning (5 minutes)
    - Definition of the problem or theme for the PBL being planned (10 minutes)
    - PBL planning on flipchart sheets (20 minutes)
    - PBL proposal presentation on a gallery walk (20 minutes)
- Presentation of PBL cases and discussion of next steps (20 minutes).

As the initial 15 minutes may be too short to discuss the principles of PBL, we intend to reinforce the main concepts and misconceptions during the discussion phase. In addition, during the definition of the topic, which may be a phase with lengthy discussions, a set of guidelines will be presented to make the activity more directive and less prone to delays.

3 Expected Results

At the end of the workshop, the participants will gain a broad understanding of PBL principles and different ways of implementation. Moreover, they will develop a plan for delivering an interdisciplinary PBL approach that may be an inspiration for the next semester.

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