



Project-Based Learning

A dynamic approach to teaching in which students explore real-world problems and challenges, simultaneously developing future skills while working in small collaborative groups

What is Project-Based Learning?

Project Based Learning, or PBL, is an instructional approach built upon learning activities and real tasks that have brought the challenges for students to solve. These activities generally reflect the types of learning and work people do in the everyday world outside the classroom. PBL is generally done by groups of students working together towards a common goal.

PBL teaches students not just content, but also important skills in ways students have to be able to function the skills like communication and presentation skills, organization and time management skills, research and inquiry skills, self-assessment and reflection skills, group participation and leadership skills, and critical thinking.

Performance is assessed on an individual basis, and takes into account the quality of the product produced, the depth of content understanding demonstrated, and the contributions made to the ongoing process of project realization.

PBL allows students to reflect upon their own ideas and opinions, and make decisions that affect project outcomes and the learning process in general. The final product results in high quality, authentic products and presentations.

Why Use It?

- Puts students in a position to use the knowledge that they get.
- Effective in helping students understand, apply, and retain the information.
- Can be more effective than traditional instruction, and increase academic achievement.
- Benefits include building skills such as critical thinking, communication and collaboration.
- Students who work on projects show increased motivation and engagement in their studies.
- Can give students an opportunity to work with professional experts who enrich and support the teacher's knowledge and how it connects to the real world

How is it Different?

- Project-based instruction is innovative by its emphasis on cooperative learning. Additionally, students create tangible results to represent what they have learned.
- Students use technology and inquiry to respond to a complex issue, problem or challenge. PBL focuses on student-centered inquiry and group learning with the teacher acting as a facilitator, as opposed to the one in charge.
- Activities match as nearly as possible the real-world tasks of professionals in practice rather than classroom-based tasks.
- This encourages interdisciplinary perspectives and enable learners to play diverse roles and build expertise that is applicable beyond a single well defined. Lastly, it allows a range and diversity of outcomes open to multiple solutions, rather than a single correct response obtained by the application of predefined rules and procedures.

Characteristics of Project Based Learning

Project Based Learning is varying from classroom to classroom, but is often characterized by the following attributes:

1. Organized around a problem or challenge without a predetermined solution
2. Requires critical thinking, problem solving, collaboration, and various forms of communication
3. Provides the opportunity for students to examine the task from different perspectives using a variety of resources, separate relevant from irrelevant information, and manage the information they gather
4. A final product (not necessarily material) is produced and is evaluated for quality

Objectives:

- Integration of knowledge and skills from various areas through more complex investigations and multi-disciplinary projects.
- Autonomous learning encouraged through independent research of unstructured problems
- Teamwork, which helps prepare students for a social environment
- Self-evaluation and self-criticism, against self-competency, trying to see beyond their own ideas and knowledge.

Outcomes:

- Use model-based learning that allows students to identify and transfer existing ideas into new contexts and applications.
- Use concept-mapping before, during, and after the project is completed.
- Gain insight into a variety of activities that can be implementing into Project Based Learning.
- To help students manage individual or team projects.

Advantages of PBL are:

- It promotes such important skills as group work, autonomous learning, self-assessment skills, time planning, project work or oral and written expression skills.
- It improves student motivation, which translates into better academic performance and greater persistence in the study.
- Encourages students to make meaningful connections across content areas, rather than thinking about each subject area in isolation (multi-disciplinary pedagogical approach)
- Engages students in real-world learning, giving them a deeper understanding of concepts through relevant and authentic experiences.

COURSE CONTENT

1. Problem Identification
2. Literature Summaries
3. Student discussions of work from literature
4. Experimental Design
5. Scientific Documentation (using LaTeX)
6. Developing a Survey Paper
7. Presentation of Survey Paper
8. Ethical issues as apply to student's work
9. Presentation