Project-Based Learning

Content	Theoretical Knowledge	Skills	Competencies
Project-based learning	- *definition of PBL* - *benefits for the learners* - *how to use project design elements to plan PBL sessions* - *instruction guidelines to support student learning* - *assessments integration to ensure student success* - *PBL implementation* - *Project Design elements*	- *use of PBL* - *developing a problem statement* - *time-keeping,* - *planning* - *scheduling work* - *creating a kanban board*	- *collaborative learning* - *teamwork* - *critical thinking* - *inquiry-based learning* - *decision making* - *problem-solving*

Introduction

Project-based learning (PBL) is an approach to teaching through which students are fully immersed in the learning. This module provides essential information and guidelines on designing and delivering PBL programs, fostering an understanding of how to embed PBL in educational programs.

Topic 1 | Project-based learning explained

Project-based learning (PBL) is a powerful teaching method that has extensive benefits for students, ranging from critical thinking to project management to self-confidence. In essence, PBL is an instructional method where learners collaborate with others and "learn by doing."

Learners work on a project over an extended period of time – depending on the length of an educational programme – that engages them in solving a real-world problem or answering a complex question and in making decisions through the use of various assessments. As a result, students gain deep content knowledge and cultivate essential employability skills such

as researching, critical thinking, collaboration, creativity, and communication. One should always keep in mind that in project-based instruction, students are at the centre of the learning process.

Comparing Conventional and Project-Based Learning

In traditional teaching, the educator begins by transmitting the information to students and then presents a problem to be solved, assuming that the conveyed content will allow students to understand and solve the problem. In the PBL method this order changes. The learning process begins by presenting the problem and the learners are the ones who must then seek and obtain relevant information to understand and solve the problem. The trainer changes their role and is no longer the transmitter of information, and guides the students to understand the problem and find solutions.

Project-based learning vs doing a project

Often the term project-based learning is misunderstood and it is important to note that simply assigning projects is much different from PBL. Projects can represent a range of tasks that can be done at home or in the classroom, quickly or over time. While project-based learning also features projects, where the focus is more on the process of learning and learner-peer-content interaction than the end product itself. (McDonald, 2019).

As published by the Buck Institute for Education, the table below summarizes the key differences between doing a project and project-based learning:

Doing a project	Project-based learning
An add-on to the traditional instruction at the end (or alongside) of the unit	Instruction integrated into the project (the project is the unit)
Follows direction of the teacher/trainer	Driven by student inquiry
Focused on product	Focused on product and process
Often unrelated to standards and skills	Aligned to academic standards and success skills
Can be completed alone and/or at home	Involves collaboration with students and in-class guidance from the instructor
Remains within the school/training centre	Has a real-world context and application
End result of project displayed in the classroom	Results of project shared beyond the classroom with a public audience

Key benefits of Project-Based Learning

Instead of short-term memorization, project-based learning provides an opportunity for students to engage deeply with the target content, accomplishing long-term retention. Project-based learning allows them to see how multiple standards and skills work together in real-life situations. Some of the key benefits of PBL for students include:

- *Increased motivation:* based on research, students participating in project-based learning showed increased attendance and improved attitude towards learning. Project-based learning instructors frequently report that students are willing to devote extra time or effort to a project (Thomas, 2000)

- *Enjoyable teaching and learning:* PBL engages students and trainers in their work, which fosters teamwork and leadership skills.

- *Improved high-order thinking:* project-based learning provides opportunities for students to develop complex thinking skills, such as problem-solving and decision making in a project. (SRI, 2000, Thomas, 1998)

- *Increased collaboration:* many projects depend on students working together in learning groups. Cognitive theories suggest learning is a social phenomenon and students learn more in a collaborative environment.

- *Growth in self-direction:* project work involves students engaging in complex tasks that help them develop organizational, time management and self-direction skills

- *Perseverance*: students learn to manage obstacles more effectively when working on a project, often learning from failure and making adjustments until they're satisfied with their work.

- *Benefits for all learners:* students who benefit the most from project-based learning tend to be those for whom traditional methods and approaches are not effective (SRI, 2000). In project-based learning, previously hard-to-reach students begin to participate in class. Access to a broad range of learning opportunities in the classroom provides a strategy for engaging culturally diverse learners (Railsback, 2002).

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Outcomes of project-based learning

Research shows that students taught via project-based learning have better long-term retention of content. PBL students also demonstrate better performance on high-stakes tests, improved problem-solving skills, collaboration and a more positive attitude towards learning (Vega, 2012).

Project-based learning can generate a variety of outcomes for students, which may vary with regard to the nature of the project. Here are some of the most common learning objectives:

- *Students learn project management:* One of the most common ways to develop this skill in students is to assign them to a professional-like project.

- *Students become more independent:* By developing and taking decisions on their projects on their own, students become more responsible, more open-minded, and innovative.

- *They are more engaged in the learning process:* They are independent in their work so they need to decide their own checkpoints and think outside the box.

- *Students make connections between ideas:* The use of cross-curricular projects that include multiple content areas complicates the planning and makes it more immersive academically.
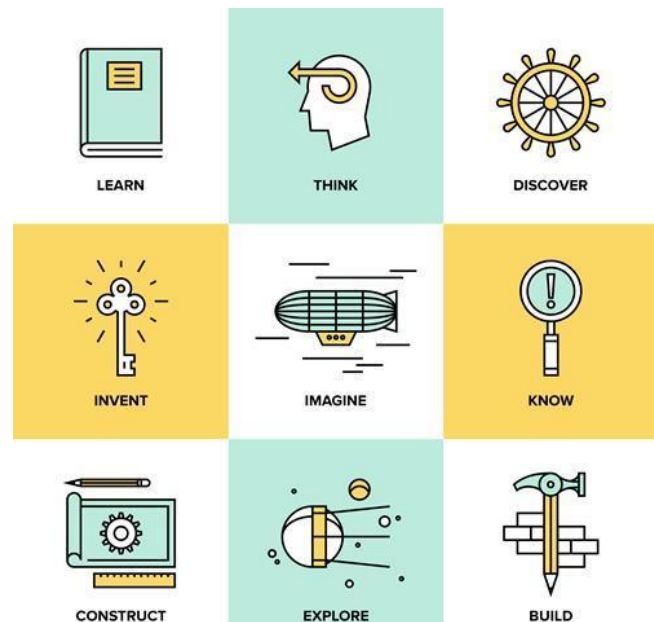
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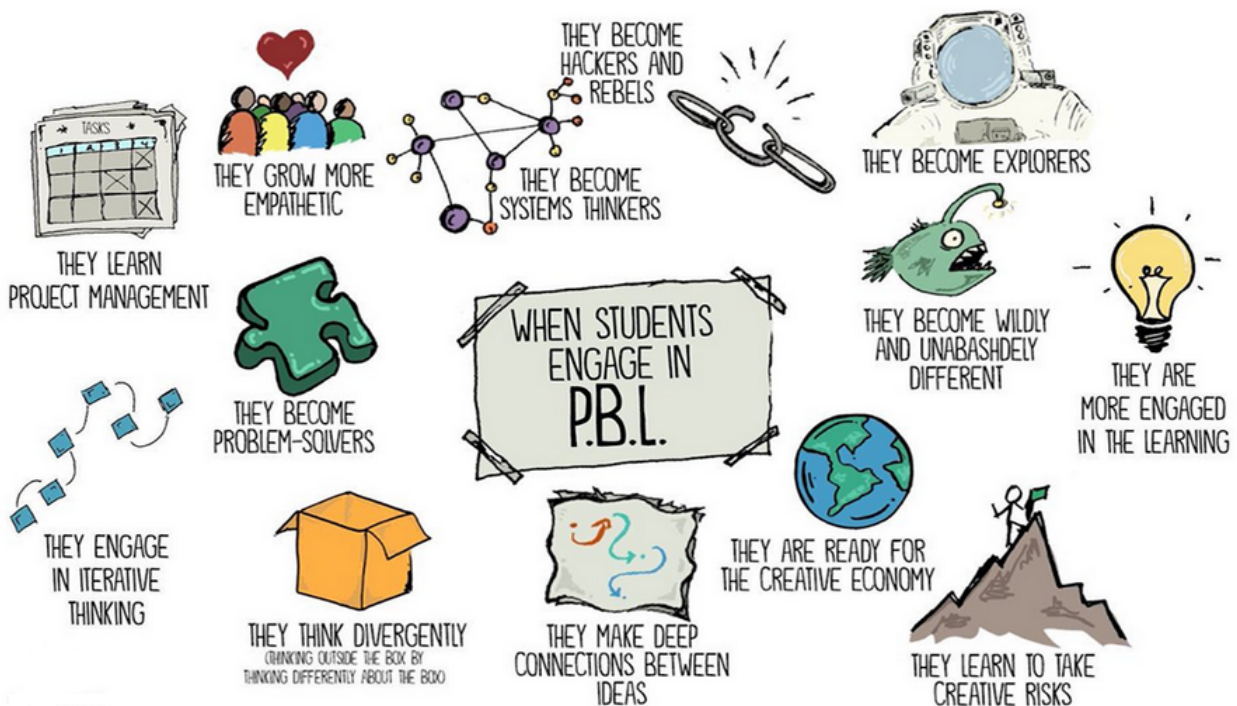
Topic 2 | PBL Implementation

„Tell me and I forget. Show me and I remember.
Involve me and I understand.”
—Chinese proverb

How to implement project-based learning?

1. *Start with the essential question.* It should be a challenging real-world topic that would inspire students to be curious, creative and motivated.

2. *Design a plan for the project.* Students should be involved in the planning or should be given full planning autonomy.

3. *Create a schedule.* When designing a timeline, teachers should be flexible and should mind that too tight deadlines might be stressful and have a negative effect on students.

4. *Monitor the students' progress regularly.* Teachers should convey a love for learning and curiosity. Whenever asked by students, teachers should provide assistance, advice and address individual needs.

5. *Assess the outcome.* Allow both self-assessment and teacher assessment.

*Source: eSchool News. (2018). How to start a project-based-learning movement in your district.*
https://www.eschoolnews.com/2018/04/05/start-project-based-learning-movement-district/ *(accessed 28 September 2021)*

6. *Evaluate the experience.* Discuss with the students what went well and what needs to be better in the future. Share ideas that will lead to new projects and new questions.

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Project design elements

Albeit the parameters and definitions of a project can be very diverse, depending on schools, teachers and students, "project-based learning" is typically linked to innovative experiential learning or discovery learning. Project-based learning provides students with profound and extensive content knowledge, development of critical thinking, forging creativity and amelioration of teamwork skills.

When it comes to project design, there are generally seven essential elements[1]:

● *A challenging problem:* The project constitutes an actual meaningful problem to be solved or investigated or a question to be answered, suitable to meet the needs and qualifications of the students. The students should be challenged by the topic of the project to discover and implement real knowledge. When developing the project itself, teachers are advised to determine the central problem with a student-friendly question[2]

● *Sustained inquiry*: Students proceed with extensive research, which is more profound than just reading or checking something up. The project is usually long-lasting and its finalization should take more than a few days. In the process, students will need to pose themselves the right questions, discover the most accurate resources and provide answers by applying the newly acquired information. Projects can require a variety of research methods – both traditional research, as well as more real-world based, such as experiments and interviews.

● *Authenticity:* Authenticity facilitates the students' motivation for research and learning. The project can encompass a genuine context, such as challenges and situations from the real world; or involve an authentic process, tasks and tools. The problem can also have a real impact on others or create something with real utility for people. Lastly, the project can refer to personal concerns, interests, and issues in the students' lives.

● *Student voice and choice*: Students make the decisions about the project, including how they work and what they create, and express their own ideas in their own voice. This way, a sense of ownership is established and students are inspired to work harder. It can be

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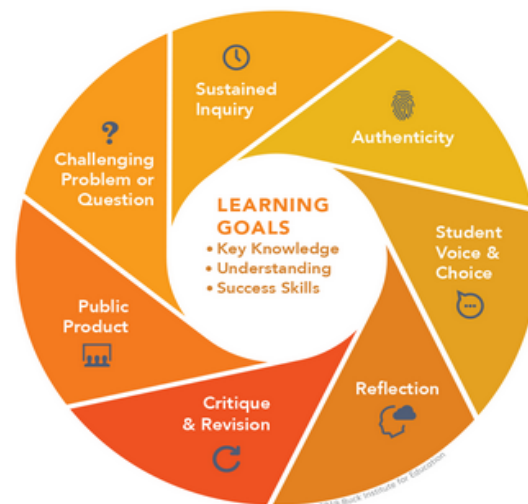
[1] *Buck Institute for Education. What is PBL?* https://www.pblworks.org/what-is-pbl *(accessed 27 September 2021)*
[2] *Buck Institute for Education. (2015). Gold Standard PBL: Essential Project Design Elements.*
https://cpb-us-w2.wpmucdn.com/wp.wpi.edu/dist/e/220/files/2018/06/Gold-Standard-PBL.pdf *pp.2-4. (accessed 27 September 2021)*

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useful to let students be autonomous with the distribution of workload, tasks and roles; the resources and tools; the questions they generate and the general format of their work.
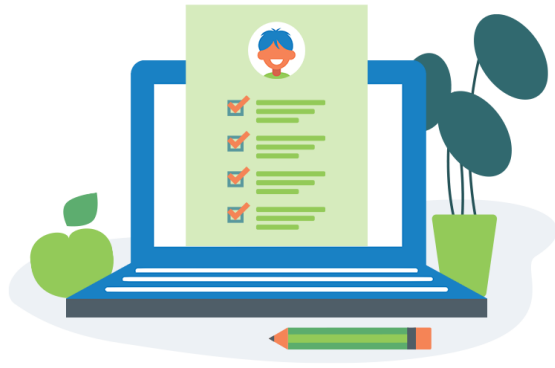
- *Reflection*: Students not only learn from experience; they also learn from reflecting on experience. In the course of developing the project, students are encouraged to reflect on the learning, the effectiveness of their inquiry and project activities. In contrast, the teachers are to examine the quality of students' work, any obstacles that arise and the strategies for overcoming them. By reflecting on their work, students can deepen their knowledge and invent how to apply it elsewhere, beyond the project and school. What is more, reflection enables students to develop skills for their future work.

- *Critique and revision*: Students are given constructive feedback, in order to improve their process and final product; students are also able to give critical opinions on other students' work.

- *Public product*: Finally, students present their project work by sharing it and explaining the contents to the public, beyond their classroom. When presenting a project to the class, students tend not to take it seriously enough. However, if presented to the public, their goals are higher and they will put more effort into it.

Project scenario

Effective project scenarios may vary. Some can also encompass the needs of a specific community. Projects can also be cross-curricular, allowing students to see how knowledge and skills are connected in the workplace. These projects require advanced planning and teamwork among teachers but can be well worth it. The pivotal aspect of each project scenario is that the idea is meaningful, challenging and authentic. Here are some examples for project scenarios:

- Develop a newsletter or a website on a specific issue

- Design and plan a community event

- Conduct a survey

- Create a students' workbook

- Prepare an exhibition for a museum, by producing audiotapes, videotapes, photographs and leaflets

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Assessment on project-based learning

Assessment is an opportunity for students to evaluate their own progress, set future goals, and determine the next steps. Throughout assessment they are evaluating the quality of their product, reflecting on the process and determining their mastery of the standards. Assessments measure how well the students have met the instructional goals. If the instructional goals are identified before starting the project, both the teachers and students will better understand what needs to be learned and how to assess the learning.

Self-assessments have an empowering effect on students, because they see it as a result of their hard work, rather than attributing it to a teacher. They become more self-directed and independent because they're constantly looking at their own progress.

Teachers' assessment of project-based learning can occur in two different forms - a summative and a formative assessment.

A *summative assessment* normally refers to the evaluation of students' competencies based on competence indicators included in the lesson plan.

The *formative assessment* is formulated with regard to the stages of the learning process – planning, implementing, reporting, etc. Formative assessment helps students make informed decisions about their learning and allows teachers to adjust their instruction to better support the students during the project-based learning process. In formative assessments, students are encouraged to reflect on their learning and its relevance to their goals and efforts, identify new research ideas and determine new learning goals.

In formative assessment, teachers are advised to have more face-to-face contact with individuals and small groups as they take ownership of the project. One helpful strategy is to ask students to create and use graphic organizers to provide tangible artifacts to facilitate conversation, clarification, reflection, and to make their thinking visible. Graphic organizers are powerful tools to support student ideas and inquiry as well. Finally, to guarantee that the students have deep content knowledge and understanding, teachers could conduct short quizzes on the content.

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Test and Evaluation

1. Project-based learning helps students to foster their critical thinking.
    a) True
    b) False

2. One of the main characteristics of conventional learning is that:
    a) it is self-directed
    b) it involves long term investigations
    c) it is teacher-centered

3. Project-based learning can be beneficial for culturally diverse learners

    a) True

    b) False

4. The first step in project-based learning is to:

    a) Design a plan for the project
    b) Evaluate the experience
    c) Identify an essential question

5. Assessment of the project outcome is based on:

    a) Participants' Self-Assessment
    b) Teacher's Assessment
    c) Participant and Teacher Assessment

6. Evaluation and assessment are the same things:

    a) True
    b) False

7. As individuals and small groups take ownership of the project, the teacher needs to have:

    a) More face-to-face contact with them
    b) Less face-to-face contact with them

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SELF-REFLECTION & ASSESSMENT

1. Why 'doing a project' is a different pedagogical approach compared to project-based learning?

2. Which do you think are the most important benefits of Project-based learning for adult learners? Name at least 3.

3. Which do you think is the best way to design a plan for a project: to involve students in the design of the project or to allow them to plan with autonomy? Why?

4. For what subject (s), do you imagine yourself using the PBL method?

5. After getting familiar with the theory, with regards to the 7 essential elements of project design, which would be the most challenging for you? What can you do to overcome any particular obstacles?

6. Take some time and think about a project scenario that you will present to students.

Then think about the following aspects:

- Is it meaningful? Why?

- Is it challenging? Why?

- Is it authentic? Why?

After answering those questions, will you need to slightly change your scenario?

Correct answers to the quiz:

1) a)
2) c)
3) a)
4) c)
5) c)
6) b)
7) a)

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More on 21ˢᵗ century skills

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