

A brief introduction to problem-based learning

What is problem-based learning? An overview

Problem-based learning (PBL) is a student-centered approach in which student learning focuses on a complex problem that does not have a single correct answer; it is the problem itself that drives the motivation and learning. Often, students work in small collaborative groups to investigate and resolve a problem that they might face outside of the school setting. The problem allows learners to apply their existing knowledge to a relevant problem, and to collectively construct new knowledge as a group.

Problem-based learning was developed in medical education in the 1970s. Still today, PBL is a very common practice in medical education: medical students are given short case vignettes for theoretical patients, and study the evidence provided and work together to deduce what may be going on in the patient and what should be done next in the course of care (Barrows, 1986). In other fields, such as law and business, PBL results from the case method. This method uses cases – often real-world examples of difficult and nuanced scenarios in which decisions must be made – as a problem-based learning exercise.

In education, problem-based learning might focus on students addressing a problem or issue that exists in their school or their local community or it might be based on the content or subject area that students currently are studying.

Is problem-based learning effective?

Problem-based learning helps students to work through real-world examples or cognitive challenges similar to what they might experience in a real-world setting. Goals of problem-based learning are to enable students develop problem-solving skills, leadership skills, critical thinking skills, self-directed learning skills, and the ability to work collaboratively as part of a group or team.

Research demonstrates that while students largely enjoy problem-based learning, when comparing problem-based learning settings to traditional direct instruction or discussion approaches, problem-based learning does not have dramatic effects on knowledge acquisition. Problem-based learning has been shown to provide a more challenging, motivating and enjoyable approach to education and there is evidence to suggest that students who engage in problem-based learning show better long-term retention and the ability to apply new material in new settings. However, the research to assess the effectiveness of problem-based learning for school-level students is still somewhat limited

Research further suggests that problem-based learning is most effective when it is used in conjunction with direct-instruction. This is because students need to acquire a base level of knowledge and skills before they are able to successfully undertake their own inquiry-style or problem-based learning.

When/ how should problem-based learning be used in the classroom?

Problem-based learning should be used once students have developed a base level of knowledge and understanding of a particular topic or subject. The chosen problem should also align with the broader learning objectives.

In problem-based learning, the role of the teacher is to 1) create the problem and 2) facilitate the learning process, rather than provide content knowledge.

- 1) *Create the problem.* Ideally, this will be a realistic problem that resonates with students' experiences, in their past, current, or future lives. Cases are often the basis of problem-based learning activities, and sometimes it is helpful for students to assume different roles or perspectives, depending on the case (i.e., teachers, parents, government officials, etc.). Good problems also often require multidisciplinary solutions, which enable learners to use skills and understanding from different content areas in order to reach a solution.

2) *Facilitate the process.* Before students engage in problem-based learning it is important that they have developed the necessary skills to enable them to effectively engage in this type of learning. This will include providing strategies for working effectively in groups or teams, how to apply their existing knowledge and how to access new information to help address the problem, and the processes for complex problem-solving including brainstorming, hypothesising, breaking the down into parts and synthesising their knowledge.

Scaffold student learning through the use of questioning strategies, but do not offer possible solutions to the problem.

Encourage students to re-read the scenario carefully, and to find answers to their own questions. Monitor learners to ensure that all students are involved: if you notice students who have not participated, ask them to comment on what another student has said, to facilitate the discussion. Also prompt students to explain their reasoning and nurture their critical thinking skills, as “problem-based learning entails generating explanations and elaborations, which include making inferences about new knowledge in order to connect it and apply it to the problem” (Wirkala & Kuhn, 2011, p. 1184).

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