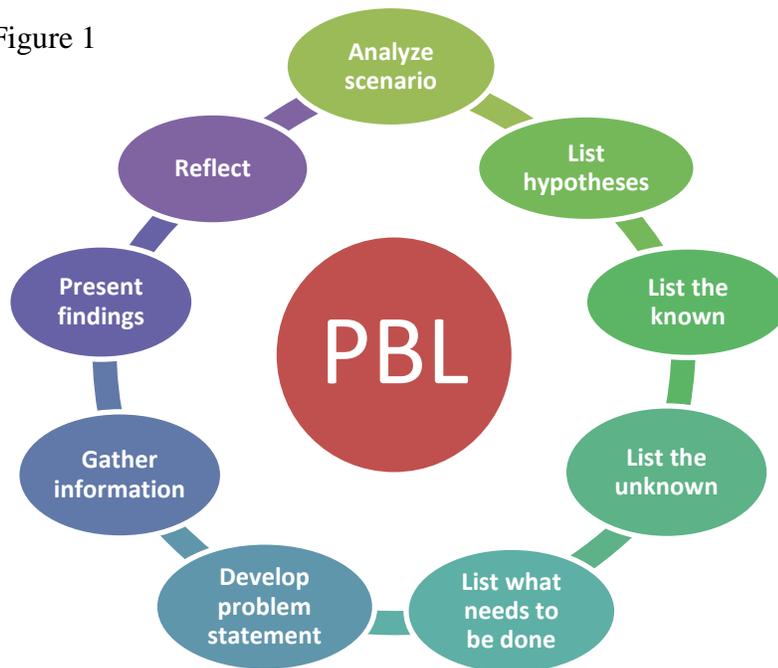# Problem-Based Learning (PBL)

Problem based learning (PBL) is an instructional approach where students learn by solving challenging, open-ended problems. The problems are authentic tasks and are solved in socially and contextually based teams of students. The students rely on their current knowledge of the problem, identify "information they need to know to solve the problem, and the strategies they use to solve the problem" (Stanford University Newsletter on Teaching, 2001).

Rather than "teach" and provide the answer to the problem, instructors take the role of facilitator, coach and mentor to guide students as they develop new skills and knowledge during the problem solving process.

Traditional versus Problem-Based Learning

Traditional approaches to learning often follow a linear process where the instructor dictates what is to be done: Information and details are presented first which the students then use to solve a problem. In problem-based learning, the problem is presented first after which students work in small teams to solve the problem. Figure 1 represents the problem-based learning process showing how each of the steps inter-connect and relate to one another and are iterative (steps can, and often should be, revisited).

Figure 1

Instructor's Role in Problem-Based Learning
The instructor identifies a problem that is purposely complex and vague yet intriguing enough to excite students to inquire about it, do research on it and draw reasonable multiple solutions or conclusions on the problem. The problem should be linked to course content; however, although the problem should not be familiar to students it should be relevant to potential future use in work environments.

The problem should help teach students new skills they will use for a problem that would be too difficult for them to complete on their own.

- Identify a problem that is appropriate for the course and student population. The problem should help teach students new skills they will use for a problem that would be too difficult for them to complete on their own. State the problem in a narrative format that includes details about its background but do not provide too much information that the students could find on their own as they search for a solution.

- Organize students in groups that represent different skill levels and diversity in an effort to achieve more successful team dynamics and outcomes. Find ways to engage students collaboratively in teams. This can be achieved by having students identify their strengths and weaknesses which will assist them as they assume different roles during the problem-solving process.

. . . your role will be facilitator, coach and mentor to guide and move students from what they already know to a deep understanding of new material.

- Provide instructional support to assist the students in building their understanding of new content and the problem-solving process. Support should be provided from the time you present the problem to when the teams present their solutions. Key here is support – your role will be facilitator, coach and mentor to guide and move students from what they already know to a deep understanding of new material.

Students' Role in Problem-Based Learning
During problem-based learning, students collaborate in small teams to explore the presented problem situation. "Through this exploration students are expected to examine gaps in their own knowledge and skills in order to decide what information they need to acquire in order to resolve or manage" the problem situation (Savin-Baden, 2004, p. 3). What follows is a method that summarizes the steps students take to solve the problem situation which is excerpted from and used with permission, *Problem-based Learning* by Landsberger (2011).

During problem-based learning, students collaborate in small teams to explore the presented problem situation

1. **Explore the issues related to the problem.** Read, discuss and analyze the problem and identify its significant parts.

2. **List what your team knows about the problem.** Discuss your team members' current knowledge and experiences that relate to the problem. Identify the strengths and capabilities each team member can offer as you explore solutions to the problem. Brainstorm possible solutions and accept everyone's contributions.

3. **Develop and write out the problem statement in your own words.** This description should be based on what you know about the

problem and what you will need to know to solve the problem. Do the following:

    a. Get consensus from the team on the new written statement
    b. Write the problem statement
    c. Get feedback from your instructor (for confirmation that you are on the right track)
    d. Be willing to change/modify the problem statement as you gather information and learn more about the problem

4. **List all possible solutions to the problem.** List ideas, speculations, and hypotheses about the problem – what are its causes and in what ways might the problem be solved? Order the possible solutions from the most likely to the least likely and choose the one your team feels is most likely to succeed.

List what your team does not know about the problem and ask questions such as, "What do we need to know to solve this problem?" or "Can the instructor provide us with more information?"

5. **List actions to be taken with a timeline.**
    a. What do we have to know and do to solve the problem?
    b. How do we rank these actions?
    c. How do these actions relate to our list of possible solutions?
    d. Do we agree on these actions and if not, how do we reach consensus?

6. **List what your team needs to know to solve the problem.** List what your team does not know about the problem and ask questions such as, "What do we need to know to solve this problem?" or "Can the instructor provide us with more information?"
    a. Discuss possible resources needed to solve the problem such as the Internet, textbooks, primary and secondary sources, interviews, the instructor.
    b. Assign and schedule research tasks to each team member.
    c. Set deadlines for all tasks.

7. **Write your team's report with the solution to the problem that includes supporting documents.** This step can act as a preliminary step that involves a draft report or can be the final report. Check with your instructor on his or her requirements.
    a. Prepare how you will present your findings by following the requirements for this part of the activity. Typically, each team presents their solutions as a group presentation to the entire class or stakeholders related to the problem.
    b. The findings should include the problem statement, questions, gathered data, analysis of the data, and support for solutions or recommendations based on the data analysis. This step will show the process and the outcome of the problem-based learning activity.

An important goal in problem-based learning is to not only present your team's conclusions but the foundation upon which they are drawn.

8. **Presenting and defending your conclusions.** An important goal in problem-based learning is to present not only your team's conclusions but also the foundation upon which they are drawn. Prepare all of the following points:

Reflective thinking helps students become more observant of their own learning environment and to pose thoughtful questions as they solve problems.

a. State both the original problem and your conclusions
b. Summarize the process in which the problem was solved: what options were originally considered, what difficulties were encountered, what resources were used.
c. Convince your audience of your solution by using supporting documents, interviews and guests and the reasons these pieces of evidence were used
d. Prepare for challenging comments and questions – clearly address and or answer what you can and if you do not have an answer, acknowledge it and refer to it for more consideration.

9. **Review and reflect on your individual and team's performance.** This reflection is an important step that will help validate what you learned and how you could improve on the process. A key component of problem-based learning is the act of reflection in which students are asked to apply what they have learned in other situations (transfer of knowledge), how they will apply what they have learned in their personal lives (as students and citizens of a community) and how they will apply what they have learned in another course-related projects (Barell, 2007). Reflective thinking also helps students become more observant of their own learning environment and to pose thoughtful questions as they solve problems.

Summary

Through problem-based learning students learn to become partners in the teaching/learning process where they accept responsibility for much of their learning, work successfully as a team member, deal with new and changing situations and develop lifelong learning skills. Problem-based learning then, can help students think critically, analyze and solve real world problems that will better prepare them for careers outside the classroom.

References

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