PROBLEM-BASED LEARNING (PBL)

Problem-Based Learning (PBL) is a teaching method in which complex real-world problems are used as the vehicle to promote student learning of concepts and principles as opposed to direct presentation of facts and concepts. In addition to course content, PBL can promote the development of critical thinking skills, problem-solving abilities, and communication skills. It can also provide opportunities for working in groups, finding and evaluating research materials, and life-long learning (Duch et al, 2001).

PBL can be incorporated into any learning situation. In the strictest definition of PBL, the approach is used over the entire semester as the primary method of teaching. However, broader definitions and uses range from including PBL in lab and design classes, to using it simply to start a single discussion. PBL can also be used to create assessment items. The main thread connecting these various uses is the real-world problem.

Any subject area can be adapted to PBL with a little creativity. While the core problems will vary among disciplines, there are some characteristics of good PBL problems that transcend fields (Duch, Groh, and Allen, 2001):

- The problem must motivate students to seek out a deeper understanding of concepts.
- The problem should require students to make reasoned decisions and to defend them.
- The problem should incorporate the content objectives in such a way as to connect it to previous courses/knowledge.
- If used for a group project, the problem needs a level of complexity to ensure that the students must work together to solve it.
- If used for a multistage project, the initial steps of the problem should be open-ended and engaging to draw students into the problem.

The problems can come from a variety of sources: newspapers, magazines, journals, books, textbooks, and television/ movies. Some are in such form that they can be used with little editing; however, others need to be rewritten to be of use. The following guidelines from The Power of Problem-Based Learning (Duch et al, 2001) are written for creating PBL problems for a class centered around the method; however, the general ideas can be applied in simpler uses of PBL:

- Choose a central idea, concept, or principle that is always taught in a given course, and then think of a typical end-of-chapter problem, assignment, or homework that is usually assigned to students to help them learn that concept. List the learning objectives that students should meet when they work through the problem.
- Think of a real-world context for the concept under consideration. Develop a storytelling aspect to an end-of-chapter problem, or research an actual case that can be adapted, adding some motivation for students to solve the problem. More complex problems will challenge students to go beyond simple plug-and-chug to solve it. Look at magazines, newspapers, and articles for ideas on the story line. Some PBL practitioners talk to professionals in the field, searching for ideas of realistic applications of the concept being taught.
- The problem needs to be introduced in stages so that students will be able to identify learning issues that will lead them to research the targeted concepts. The following are some questions that may help guide this process:
  - What will the first page (or stage) look like? What open-ended questions can be asked? What learning issues will be identified?

- How will the problem be structured?
- How long will the problem be? How many class periods will it take to complete?
- Will students be given information in subsequent pages (or stages) as they work through the problem?
- What resources will the students need?
- What end product will the students produce at the completion of the problem?
- Write a teacher's guide detailing the instructional plans on using the problem in the course. If the course is a medium- to large-size class, a combination of mini-lectures, whole-class discussions, and small group work with regular reporting may be necessary. The teacher's guide can indicate plans or options for cycling through the pages of the problem interspersing the various modes of learning.
- The final step is to identify key resources for students. Students need to learn to identify and utilize learning resources on their own, but it can be helpful if the instructor indicates a few good sources to get them started. Many students will want to limit their research to the Internet, so it will be important to guide them toward the library as well.

The method for distributing a PBL problem falls under three closely related teaching techniques: case studies, role-plays, and simulations. Case studies are presented to students in written form. Role-plays have students improvise scenes based on character descriptions given. Today, simulations often involve computer-based programs. Regardless of which technique is used, the heart of the method remains the same: the real-world problem.

WHERE CAN I LEARN MORE?

- [PBL through the Institute for Transforming Undergraduate Education at the University of Delaware](#)

READINGS

- Duch, B. J., Groh, S. E, & Allen, D. E. (Eds.). (2001). *The power of problem-based learning.* Sterling, VA: Stylus.
- Grasha, A. F. (1996). *Teaching with style: A practical guide to enhancing learning by understanding teaching and learning styles.*Pittsburgh: Alliance Publishers.

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We offer the following resources for instructors:

Sample Syllabi

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