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What is Problem-Based Learning?

It's so much easier to suggest solutions when you don't know too much about the problem.

Malcolm Forbes

by: Bob Harrison

Problem-Based Learning is a curriculum development and instructional method that places the student in an active role as a problem-solver confronted with ill-structured, real-life problems. It is most commonly characterized by five facets:

*Ill-structured problem

*Real life significance

*Student-led

*Instructor Facilitated

*Community Focused

Academic institutions, police academies and other training organizations have been moving from static, teacher-centered means of instruction toward more student-focused means of transferring the learning of concepts to their students. One of the goals of this move are to create training that causes a "need to learn" on behalf of the student. Another is the delivery of education that allows the student to practice and refine traits and skills they will use in the real world. Problem solving approaches, such as the case study method and Problem-Based Learning (PBL) are two ways an instructor could structure their class experience to address similar objectives.

PBL can be used to describe a variety of approaches to instruction, all of which share the common trait that they anchor much of the learning and instruction in "concrete problems" for students to analyze and resolve. PBL emerged in practice in 1974 in the Netherlands by the faculty of the new medical school of Maastricht

University.¹ The Health Sciences program at McMasters University in Hamilton, Canada soon followed suit. From 1974-1994, McMasters expanded PBL to law, economics, liberal arts, engineering and psychology programs. For medical students, Barrows² noted five objectives of PBL:

- Construction of clinically useful knowledge
- Development of clinical reasoning strategies
- Development of effective self-directed learning
- Increased motivation for learning
- Becoming more effective collaborators

In studies assessing the effectiveness of PBL, researchers found students, immediately after PBL processes, did significantly poorer on immediate multiple choice tests. Six months later, though, these same PBL students demonstrated a recall of concepts up to five times higher than the traditionally-instructed groups.³ Certainly, this leads one to ponder what “success” might mean in an adult learning setting. Given that real life rarely offers multiple choice tests, and that it favors those who can act on learning, might PBL be an effective means to achieve the true goals of any training setting?

PBL is used from early elementary education through the university level and beyond. The University of Delaware’s Institute for the Transformation of Undergraduate Education (ITUE) is dedicated to the use of PBL in a variety of disciplines in both the hard sciences and social sciences (www.udel.edu). Police agencies have also incorporated elements of PBL into the basic training of new peace officers. The Royal Canadian Mounted Police Academy in Regina, Saskatchewan is perhaps the most prominent example of this methodology.

PBL is consistent with the tenets of active adult learning. Its emphasis on self-directed learning means students must engage and move through learning with a high degree of accountability. It also means the planning and managing aspects of instruction may have a greater portion of the teacher’s time. General steps to follow are:

- Identify, consistent with the learning objectives of your lesson or topic, potential “problems” for work in the class setting
- Brainstorm a possible “problem” that will illuminate the concept within that application or setting
- Select at least one “real-world” application or setting for that concept
- Ensure the problem scope and focus is conformed to the scope and nature of effective PBL problems as described below
- Further develop one problem for the envisioned class

¹ Evensen, Dorothy & Cindy Hmelo (eds) (2000). Problem Based Learning – A research Perspective on Learning Interactions. Mahwah, New Jersey: Lawrence Erlbaum Assoc. Publishers.

² Barrows, H.S. (1985). How to design a problem-based approach for the preclinical years. New York: Springer

³ Evensen and Hmelo, page 34

- Structure the problem, including the initial and essential questions that will induce students to discuss the issue
- Identify potential “chunking” of the problem to allow it to unfold in the time available for its work

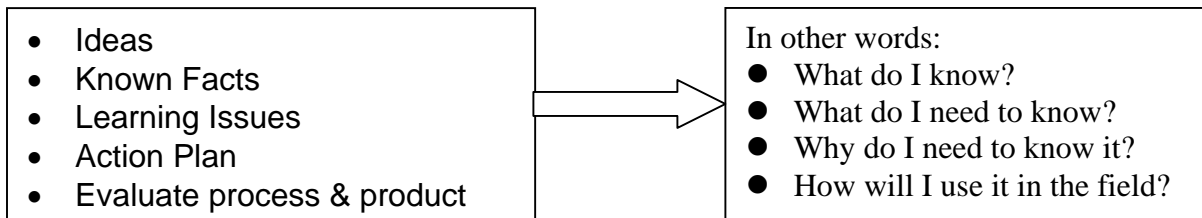
To Facilitate Knowledge Transfer

For any self-directed learning exercise, the instructor should be mindful of concepts consistent with effective adult learning. In a police academy setting, that may also mean breaking through the barrier of conformance and discipline to offer students time to devote their focus to self-directed and small-group study rather than more structured class lectures or similar activities. Consider for PBL or any similar approach that:

- Adults must be partners in their own educational plans & evaluations
- Adults learn experientially based on positive and negative experiences
- The material must be relevant to the adult learner
- Problem-based learning is more effective than content-based instruction

The PBL Method

PBL problems are constructed within a problem one could encounter in real life, and which is consistent with the trainee’s intended or actual skills and traits. They may be as short as a few hours, or may be scaled to run across the length of a semester course. All PBL problems, however, share five core aspects:



How Does It Work?

- Individuals (or groups) are given a problem to solve
- The problem should relate to the current or future anticipated work of the group and be based on complex “real world” situations
- The problem should not offer easy or clear solutions and be “ill-structured”
- Information needed to solve the problem is not initially given. Learners must identify possible needs, locate potential resources and use them appropriately
- Problems should drive the need to learn more as a process of resolving it
- Learning is initiated by the problem, and not content or information
- Learning is active and integrated

Characteristics of Effective PBL Problems

Good PBL problems encourage students to be energized to resolve it, and from which they can derive learning applicable to their future work. As you plan and create that “problem” consider these necessary characteristics:

- They require contemplation and decision-making on behalf of students
- They will be multi-stage, with information unfolding from stage to stage
- They are designed to encourage group problem-solving
- They are aligned with course learning objectives and higher-level Bloom’s critical thinking

PBL Construction – A Learning Activity

OK, you’ve had a chance to consider what PBL is, and how it might be used in your training. At this point, you may be interested to see how it might look, feel and sound if you chose to follow that path. The following is offered as an encouragement for your planning.

Take fifteen minutes to use the concepts of the PBL method and the five steps in the PBL process to construct a possible PBL problem to incorporate into your lesson plan. You should write out the problem statement, then add your expectations regarding how the students will be asked to deal with it, You should also identify what resources they may need to access, what learning issues you anticipate, and how you may evaluate success using the problem and learning derived.

If stuck at any point, consider the envisioned outcomes for students as described by course goals and learning objectives. How best might you construct a self-directed activity to accomplish them? Brainstorm, toss in ideas that may seem outlandish to others, and feel free to include incidents from your own or a peer’s experience. The core idea of PBL is to provide opportunities for students to refine critical thinking, problem-solving and resilience when faced with problems in real life. The ideal PBL problem will fold in elements to address each of these concepts.

Remember:

The problem precedes instruction

Transference of learning reinforced by attachment of issues to real life

The most important part of the problem is that it be REAL

- **Relevant** – Is the problem relevant to the work of a police professional?
- **Engages Learner** – Can they take interest and find ownership in the problem?
- **Assorted Solutions Expected** – Can they envision more than one viable solution?
- **Learning Objectives Clear** – Can they identify what knowledge they need to acquire to solve the problem?

The Five Basic Steps in the PBL Process for students:

1. Ideas (“Consider the problem”)
2. Known facts (“Defining the problem”)
3. Learning Issues (“Learning about the problem”)
4. Action Plan (What will be done”)
5. Evaluate product and process (“Is the problem solved?”)

Ideas – This is the phase during which brainstorming, group collaboration and the generation and collection of all ideas should occur. Work in this phase is often “raw” and less judgmental of the “right” answer than the possibility of identifying and using possible resources to resolve the problem. Careful thought should be given, however, to what “the problem” truly is, and not inadvertently focusing effort on symptoms at the expense of core issues.

Known Facts – This phase devotes efforts to identifying what is known about the problem, helping to clarify the depth and complexity of issues. Facts may also include relevant laws, policies and procedures and any methodologies for resolving the problem.

Learning Issues – This phase seeks to answer the question of what needs to be known to solve the problem, and may entail consulting others, uncovering necessary information, refining ideas and known facts as new understanding emerges and eliminating ideas or options that are seen as unworkable or irrelevant.

Action Plan – The problem-solver (or team) develops a plan of action grounded in the known facts, learning issues and conclusions regarding the possible resolution of the problem.

Evaluation – In a training setting, an assessment of the success of the individual or team most often is completed using a rubric known to the learners prior to the start of the PBL effort. It should assess how the problem was solved (did the chosen approach solve the problem in an appropriate manner?) and the effective use of the PBL protocol. The rubric may also assess what was learned and how the learner might transfer new understanding to their real-world issues.

PBL Problem Exercise

Consider your current or planned instructional area or domain. Think about transitioning a portion of that instruction to a Problem-Based learning environment. What would it look like? What kind of problem or problems would you create to transfer the knowledge you have to the students who need it?

For additional information on trainings in problem-based learning, contact Sierra Training Associates on the web at www.sierra-training.com. You can also contact us to inquire about trainings and workshops on PBL, Nonverbal Intelligence, speaking and teaching effectiveness and many other topics. All of these offerings can be customized to address your specific goals.