Problem-Based Learning: An Introduction

James Rhem, Executive Editor

There must be something compellingly effective about problem-based learning, given the level of faculty interest in it all through higher education. After all, no one thinks it’s easier or takes less time. And, as with almost every other change in teaching, students resist it, at least at first. Why, then, have medical and professional schools embraced it so enthusiastically? Why has the Pew Charitable Trusts given over $600,000 to the University of Delaware and a similar grant to Samford University in Alabama to investigate restructuring traditional instruction along problem-based lines?

What It Is

In some ways what PBL is seems self-evident: it’s learning that results from working with problems. Official descriptions generally describe it as “an instructional strategy in which students confront contextualized, ill-structured problems and strive to find meaningful solutions.” But where does it fit compared with all the other “learnings” faculty hear about—“cooperative learning,” “collaborative learning,” and “active learning”? The proliferation of “learnings” and their attendant partisan camps invites the reawakening of long-standing faculty prejudice against educational fads and “methods.” Even so, interest in PBL grows because not only does research show a higher quality of learning (though not a greater amount if “amount” equates with the number of facts), but problem-based learning simply feels right intuitively. It seems to reflect the way the mind actually works, not a set of parlor-game procedures for manipulating students into learning.
Thus, seen as a reification of cognitive processes, in a problem-based approach teaching and learning at last seem like two sides of one coin, not something done by one group to another, and faculty instinctively feel the intellectual commonalities between research and teaching, between their own intellectual lives and their role in the intellectual lives of students.

John Cavanaugh, vice-provost for Academic Programs and Planning at Delaware and principle investigator on the Pew grant, sorts out the place of PBL among the “learnings” this way: “Imagine a family tree: Active Learning would be at the top. Cooperative/Collaborative would be a subset of that, and I see PBL as a subset of Coop/Collab based on cases. All forms of group work don’t center on cases; problem-based groups do.”

**Historical Origins**

The modern history of problem-based learning begins in the early 1970s at the medical school at McMaster University in Canada. Its intellectual history is far older. Thomas Corts, president of Samford University, sees PBL as “a newly recovered style of learning” In his view, it embraces the question-answer dialectical approach associated with Socrates as well as the Hegelian thesis-antithesis-synthesis dialectic. As John Cavanaugh puts it: “It’s like discovery-based learning in the 1960s. We knew it; we didn’t do it. Dewey talked about it when he talked about ‘engagement.’ Dewey had it right on the abstract level. We do the details better now, that’s all, and that’s because of advances in cognitive science and in technology.”

Until recently the PBL approach has flourished mainly in medical and professional schools. Slowly the sciences in general have begun taking it up, and even more slowly, the humanities. PBL does not have a store of transferable techniques or methods like Cooperative Learning, no “jigsaw,” no “think-pair-share” or that sort of thing. Opinions vary on whether PBL should be implemented for entire courses or whether it can be used merely to teach certain parts of courses. In general, advocates accept faculty easing into the approach piecemeal, but favor course-long continuity.

**Roles And Procedures**

Usually, a class is divided into groups of approximately five students each. The groups’ membership generally remains constant throughout the term. At the purest level, the groups define the “learning issues” they believe each new problem presents and decide how to divide their labors to resolve them. Thus, aggressive PBL implementation requires ample library resources. Likewise, large class situations require an adequate number of tutors to act as support and facilitators to the groups.

Indeed, this facilitator role poses the strongest challenge for some faculty. Knowing how to work with groups (as well as how to train groups how to work with each other) is not something most faculty presume expertise in. Knowing how to guide without seeming to be coyly hiding the answer is no mean feat. And it’s not an easy matter posing authentic problems, problems with a certain open-endedness about them, either.

“This approach keeps a constant flow going between teacher and student, and you can’t put a price tag on that.”

When it comes to creating problems, John Cavanaugh says: “One place to start is to take your exams and work backwards. Take those word problems and essay questions and make cases out of them.” Loreta Ulmer, who teaches psychology at Delaware Technical and Community College, says it’s hard work revamping a course into problems, “but after you’ve done it, the whole course becomes so exciting, you’d never go back.”

Ulmer uses a modified form of PBL, combining mini-lectures on
Editor's Note:

When Linda Walsh’s article arrived in the spring, I sent back a long message saying, “Your data don’t show much positive result.” I misjudged Ms. Walsh. Months passed and early this fall another letter with more results arrived. Walsh recounted how she’d been discouraged not to have more concrete evidence that her many efforts to connect with the hundreds of students in her psychology classes really worked. She’d wanted to personalize their experience even if there were hundreds of them.

She’d considered giving up, but decided not to. “I think that for every student that actually expresses appreciation there are many others that benefit from the contact, but would never think to tell me so,” she wrote.

I suggested running her piece as a kind of “open letter” to *Forum* readers, an invitation to explore the problem together. She agreed. So, it’s up to readers now to complete or join in the work Linda Walsh is doing. Her letter, together with the qualitative data (messages from students) are posted on the Forum’s Web site.

The theme of ongoing problems pervades this edition of the *Forum*. From the feature on “problem-based learning” to the book review essays by Laura Rendón and Jan Smith, to Tom Creed’s conversation with Ed Neal on reducing the glare of technology, to my ruminations on subliminal diagrams, puzzles and good questions run throughout. I welcome the book reviews since both become examinations of diversity and we’ve just added important diversity material to the *Forum’s* on-line library.

Astute readers will see that problem-based learning also addresses diversity issues. As a pedagogy, it relies on social process and respects the common dignity of thought and learning. As Kurt Burch, one of the teachers interviewed for but not quoted in the article, told me: “My attraction to it was basically political. It increases participation by minorities, by women, by shy people. It makes a class very democratic.” I met so many impassioned teachers researching this story, collected so much more information than a newsletter can carry, I’ve posted interview vignettes as further background. With PBL, as with any approach, it’s the passion, not the method that matters most. Thus these interviews may form the best introduction one could have to PBL.

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helpful in sorting out guidelines in the absence of elaborated research data. For example, confronted with the fact that "few theory-based guidelines are available in the literature," he offers characteristics of ineffective problem design at the University of Limburg in the Netherlands where he teaches, as cautions in constructing effective problems. He offers these three:

- "Ineffective problem descriptions include questions that are substituted for student-generated learning issues."
- "The title of an ineffective problem is similar to titles of textbook chapters."
- "An ineffective problem does not result in motivation for self-study."

For an intelligent argument against problem-based learning as "ontologically narrow and epistemologically inconsistent," see "A Critical Investigation of the Problems with Problem-Based Learning" by Tara Fenwick and Jim Parsons, 1997 (ERIC Document: ED409272).

Find further bibliographic information posted at www.ntlf.com. A number of content-rich Web sites offer information on problem-based learning.

The University of Delaware's site (http://www.udel.edu/pbl/) contains articles about problem-based learning by faculty in various disciplines who have implemented it in their classes on the Delaware campus, as well as articles on problem-based learning written by Barbara Duch and others who've become practical experts in the area. The site also includes a comprehensive listing of links to other PBL sites.

A well laid-out, eight-page tutorial on the topic resides at http://edweb.sdsu.edu/clrit/learningtree/PBL/WhatsPBL.html. The tutorial covers such matters as Barriers, Overcoming Barriers and Implementing PBL, Assessment of Problem-Based Learning, and Creating an Appropriate Problem.

Three listserves now exist dedicated to problem-based learning—PBL-LIST, based in Australia, IMSACPBL-1, devoted to K-12 uses, based in Illinois, and UD-PBL-UNDERGRAD, focusing on undergraduate instruction, out of Delaware. Here's information on subscribing to these lists. In doing so, remember to disable your signature file, leave the subject line of your message blank and in the body of your message write: "subscribe <list name> <your name>.


UD-PBL-UNDERGRAD (owned by the University of Delaware). Subscription address: majordomo@udel.edu. Additional information at: http://www.udel.edu/pbl/ud-pbl-undergrad.html.

PBL Resources

Additional reading on Problem-based Learning begins with two small books:


Gijseelaers’s chapter, “Connecting Problem-Based Practices with Educational Theory,” is particularly

So Long, Tonto

So why now? If problem solving, “engagement,” applying, active questioning have been recognized as the keys to motivation and effective education for generations, why has the approach been “newly recovered”? For at least two main reasons. David Chapman, associate dean of Arts and Science at Samford University, points to the “information explosion.” That, he says, has made “the coverage model in traditional survey courses more and more difficult to defend.” Barbara Duch puts it plainly: “Faculty have to make hard decisions and get to the essentials.”

“The Lone Ranger is gone,” says John Cavanaugh. That’s the second reason PBL’s time has come. “The way the world works now, it’s about working together.” What students learn about collaboration, different approaches to a problem, cooperation and responsibility, makes their learning in PBL courses multisided, richer, and, in that way, deeper.

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