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# Real-World Solutions for Real-World Collaboration Problems

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**Real-World Solutions for Real-World Collaboration Problems**  
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**Abstract:**

Are you finding collaboration with faculty difficult to initiate? How about a new approach? Problem-based learning (PBL) is an instruction method that investigates and resolves messy, real-world dilemmas. This workshop demonstrates how librarians at Purdue University worked with faculty to incorporate information literacy skills into course content using PBL.

**Introduction:**

What do information retrieval skills and problem-based learning (PBL) have in common? All too often, in this age of instant answers, data collection begins before the information need is really identified. Technology savvy students consult their favorite search engines for details about a particular interest or problem by entering in a few key words and clicking on the search button. For these students, information retrieval is based solely on dumb luck and finding a smart search engine that returns something useful back to them.

PBL, on the other hand, promotes critical and analytical thinking skills by applying the learner's own expertise and experience to the initial problem solving and data collection – a much more effective way to begin the information retrieval process! In most PBL activities, the students should be prepared to gather facts based on what is known, identify and ask questions about what is not known, formulate a problem statement and hypothesize about the solutions, locate information to support those ideas, and evaluate the materials they find – skills librarians refer to as information literacy.

This workshop introduces ways for librarians and faculty to collaborate using information literacy skills as the foundation for developing effective problem-based learning experiences. Participants will engage in hands-on activities to identify where information literacy skills fit into particular courses, incorporate these skills into real-world problem solving activities, and strategize ways to collaborate with faculty by integrating these activities directly into the course projects and assignments.

**What exactly is PBL?**

Problem-based learning (PBL) started at McMaster University in 1969 (Neufeld et al 1989) as curriculum reform for medical schools. It is now one of the most advanced teaching approaches being used across many disciplines. This strategy creates learning opportunities out of everyday situations, turning otherwise boring lectures into dynamic experiences.

PBL is based on real-life simulations. The problems are deliberately ill-structured and designed for thoughtful and careful analysis to help improve students' critical thinking skills. The open-endedness of these kinds of problems allows the students to explore areas of interest, thus establishing ownership of the learning experience. For further information, read Duch, Groh, and Allen (2001) and Fogarty (1997) to learn more about the context of the PBL approach.

PBL is a challenging but rewarding teaching strategy. It involves a significant change in the way we teach and learn. As the role of the instructor changes from leader to facilitator or coach, the role of the students become very active as they take control of the problem (Smith and La Lopa 2000). This approach requires a certain amount of willingness to try (and fail) before you get it "right." Using PBL to advance information literacy training calls for buy-in and good, solid partnerships with subject-area faculty.

### **Forming collaborations:**

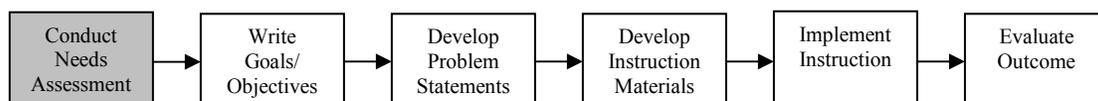
PBL exercises for building information literacy skills are created in the context of a course's curriculum. Unlike the situations where a faculty member just asks for 'a how-to-use-the-library' 50 minute one-shot, you will be working with the faculty partner to jointly develop problems that both meet the needs of the curriculum and can be accomplished with the information resources available to the students.

When looking for potential faculty collaborators, investigate the local excellence in teaching unit on campus. Purdue University, for example, has the Center for Instructional Excellence (CIE), which uses permanent staff as well as regular faculty to provide instruction on improving teaching. We found that by faculty's attendance at CIE-sponsored events, they demonstrate an interest in innovations or otherwise improving their teaching, and thus are disposed for creating potential partnerships.

In addition to networking, making connections with influential instructors and leaders within CIE means that, if instructors go to the leaders with a problem-based learning question, we can be referred to as people to talk to about it. Indeed, we can even influence those leaders to increase the visibility of information skills at the institutional level. By actually giving a CIE seminar, you can increase your visibility across campus even more so. In other words – become involved!

All the usual methods of finding potential collaborators apply in this situation. Observing students using the library for assignments, checking course syllabi, and networking with faculty all will help to determine which professors are giving research projects to their students. Creating problem-based learning exercises is time consuming. Look for faculty who are interested enough in improving student learning outcomes to devote the extra time to successfully implement PBL.

### **The instructional design process:**



### **Start with a needs assessment:**

Once you establish a collaborative arrangement to work with faculty, then the real work starts. You will want to begin with information literacy needs assessments of the faculty members with whom you will be partnering. At this point in the relationship it is critical to listen and build trust. Try not to interject your ideas yet. Ask questions and take notes about their immediate information needs and concerns.

Using a good reference interviewing technique will help you to elicit information about what they really want from you. This is the first step in a very thorough needs assessment. Some of the questions we found helpful in evaluating how to begin developing partnerships are:

- What are the goals and objectives for the course?
- On what kinds of projects will be students be working?
- How will they use information sources to help them complete these projects?
- What problems did you observe in students' overall performance on these projects in past semesters?
- Do students need to know how to evaluate and cite information sources as a part of this course?

Another critical step in exploring information needs is to carefully review the syllabus with your faculty partner. If there is a textbook required for the course, or other assigned readings, ask to see those as well. The more information you can obtain on the course, the more effective the needs assessment – the better integration of useful information literacy skills. At times, when the content area is beyond your expertise, you may need to ask the faculty member to recommend some primer readings to help you understand the course materials better.

After you are confident that you understand what the faculty partner wants, reiterate those needs back to him or her. Try not to do this all in one day. Give yourself about 2 hours to conduct the initial interview. Another 4 – 6 hours to familiarize yourself with the literature and course materials. And another 2 – 3 hours to synthesize . . . (did we say this was an easy process?) When you completed these tasks, your needs assessment is finished and you can start to pull some ideas together about how you will work information literacy skills into the course content.

The needs assessment will also tell you what direction the faculty member wants take the information skill building experience. Knowing this upfront will clarify your role in the development and delivery of the instruction. You may take a more active role in the classroom, or you may be more of an instructional designer working on the development of various information seeking problems and problem solving activities behind the scene.

## Is PBL the right approach?

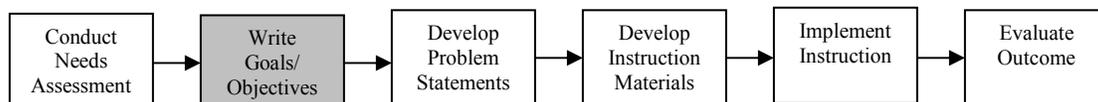
Whatever the role you play, there are some key requirements for a problem-based learning approach. Before you start to develop an instructional plan, consider if PBL is the best approach for your collaboration with the faculty member. If it is the right approach, the following profile will fit the course:

- *Problem-based learning is built on ill-structured problems.* These are basically problems or situations that simulate real life. Unlike structured problems which are designed to have right and wrong answers, ill-structured problems are open ended. Often there is information missing that the learner needs to address before solving the given problem. Does this course lend itself to an ill-structured problem? Are there real-life scenarios that can be adapted for instruction?

We used a variety of real-life scenarios – trying to incorporate current issues when possible. Some came from the field, such as the problems written for a policy course in forestry. These scenarios were taken from court cases and newspaper articles. Other courses required a more global approach. These broader problems came from sources such as newspapers, Nation Public Radio stories, magazines, and web sites.

- *Problem-based learning requires teamwork.* The problems are complex enough to provide a role for every member (for teams of 4 – 5 people). Is there enough time to devote to problem solving – either in or outside of the regular class meeting? Establishing a good learning environment means adjusting class schedules to accommodate the needs of group activities. Sometimes this means giving up class time to do hands-on work. Is the faculty partner open to this?
- *Problem-based learning activities end with a project or product to show resolution to a problem scenario.* In our PBL experiences, we required the students to present an electronic poster session. These posters were “peer reviewed” on content and style. Having them available electronically meant no one had to try to pay attention to 15 presentations – one right after the other. They could look at the posters – taking as much or as little time as needed- to offer a complete review.

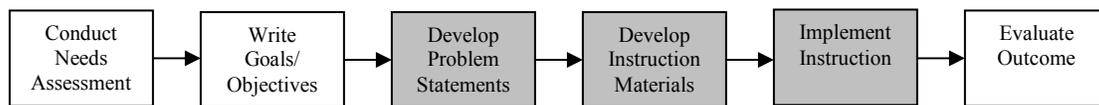
These three statements provide a quick overview of what a PBL experience might look like. Once you determine if this approach is right for your collaboration, start writing the instructional goals and objectives you want to meet with your faculty partner. Knowing what you want the learner to accomplish in solving the problems will ensure that the information competencies you set out to integrate really do become a part of the course content.



## Planning the instructional goals and objectives:

You might start the instructional goal setting by showing the faculty partner an abbreviated list of the Information Literacy Competency Standards for Higher Education, which can be found on: <http://www.ala.org/acrl/ilcomstan.html>. This web site provides a comprehensive view of what information literacy is and how these skills will help improve students' overall learning outcomes. (We have yet to have a faculty member turn down an opportunity to work with us after reading the information found there.)

The trick to setting goals (especially after reviewing the competencies) is knowing how much you can cover in the time allotted for instruction. Typically, 3 goals are more than enough for one PBL activity. You might want to start small with the basics. For example, we started our first PBL sessions by having the students read the scenario and identify what they already knew about the problem. Second, they wrote a problem statement (hypothesis) and finally, they identified what they did not know and listed their information needs. At this point, they were ready to start constructing search strategies to find information to solve the given problem.



When the instructional goals are set, writing the problem scenarios should follow fairly easily. Good problems will unfold like the telling of a story. The scenarios simply provide the scaffolding to entice the learner to add the middle and ending parts by building a plot. To start the story, try using the following five steps as a foundation.

### Five steps (and hints) to writing problems for PBL:

1. Find a situation that has a set of phenomena or data in need of an explanation. Try to stay current and keep the situation relevant to the students' real-life experience. This will help to keep the motivation going and the problem solving experience interesting.

**Hint:** Try using newspapers, popular magazines like *Time* and *Newsweek*, websites, and television – especially the news or talk shows - to find sources for developing problem statements.

2. Identify 4 – 5 learning outcomes that you expect will result from completing the problem solving activities. Always ask yourself the question, “What do I want the learner to know – or be able to do – after solving the problem?”

**Hint:** Use *Bloom's Taxonomy* (Bloom 1956) as a guide to help you identify specific learning behaviors you want to see as the students are working through the problem solving experience.

3. Re-write the problem as a problem statement for the learning experience. One way to do this is to create a hypothetical situation in which the students must solve the problem.

**Hint:** Medical schools put the students in the role of the doctor, or a team of doctors, working with a patient. You might want to take the same approach, giving students various roles appropriate to the problem statement.

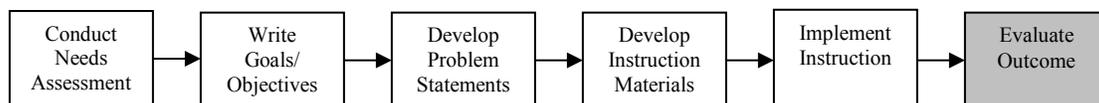
4. List the skills or life experiences you expect students already have to solve the problem. This existing knowledge is the building block for new knowledge – the KEY to PBL.

**Hint:** Use the Information Literacy Competency Standards as a guide and ask the faculty partner help identify some skills the students may already have. You might also want to administer a pretest, if time allows.

5. Test the problem statement to ensure it requires critical thought and explanation. Avoid being subjective in your questions. The best way to do this is to require the solution to be a product of some kind.

**Hint:** A bad question looks like this, “Nuclear power is an alternative energy source supported by the Bush Administration. Do you feel this is a good decision? Support your answer.” This is OK for an essay exam – but there is no real problem solving accomplished in answering this question.

A better way of writing the problem statement would be: “Nuclear power is an alternative energy source supported by the Bush Administration. Your team is a group of lobbyists either in support of or against the Administration’s decision to put more federal funding into research for nuclear power. Your constituents at home are seeking action on Vice President Cheney’s announcement of \$1.5 million dollars to three California universities conducting research on nuclear and alternative power sources as possible solutions to the recent shortage of electricity. *Write a letter to the editor explaining your group’s position.*”



### Evaluating the problem-based instruction:

Since, most likely, you and the subject faculty are new to problem-based learning, it is important to get feedback from the students to see what you are doing well and what can be improved. Writing effective and engaging problems is difficult, and there will be the inevitable skinning of knees as you learn how to do it well.

Even if a problem scenario does not go well, the subject faculty are usually forgiving, as they’ve certainly had situations in their own teaching careers where they’ve run into

trouble. The key to maintaining faculty collaborations in this situation is to have plans for making the instruction better ‘next time.’ To do that, and, in general just to help improve your instructional performance, it helps to have data. Especially when developing new techniques for teaching it is important to get both summative and formative data. The former gives you some idea of how students feel about the actual instruction, while the latter helps to determine whether course objectives have been met.

To obtain summative information, for our problem scenarios we gave students evaluation forms to determine what their self-identified learning outcomes were. For example, do they agree with the following statements: ‘my search skills improved,’ ‘I can apply skills to my final project,’ ‘I am able to find and evaluate information’). To determine what the students actually learned, we examined the problem solutions, feedback from the instructors, and our own evaluation of students’ work on assignments and final projects.

For the formative information, we get a feel for the student attitudes during the class session. Are students engaged, are they staring off into space, are they working as a group or ignoring each other and doing their own thing? We also ask formative questions on our student evaluations. Did they like the way the problem was introduced? Was it interesting? Was working in groups valuable? Were the problem solving steps logical? Did the students find workable solutions? These kinds of questions can help you determine how your teaching or facilitating of the problem can be improved, and what activities within the problem scenario were done well.

### **Conclusion:**

We have sketched out the framework for implementing problem-based learning techniques to advance the information literacy curriculum. First, you need to find a subject faculty member motivated to improve student-learning outcomes. Second, you must conduct a complete needs assessment to determine what information literacy skills are most important to your faculty partner. Don’t skimp on the time spent in doing this assessment. It is the most essential tool in developing a successful collaboration. Once you accomplish these steps, implementing a new teaching approach will be less daunting and much more rewarding.

We are keeping a list of the pros and cons of using PBL to integrate information literacy skills into the curriculum. We hope that if you try this approach with your faculty, you will contact us with questions and comments. Good luck!

### **Challenges:**

- A PBL curriculum takes an enormous amount of time to create and maintain.
- Not every student learns well in this environment. Equally notable, not every instructor can adapt to the PBL approach.
- The initial experiences can be difficult until the faculty and students adapt to the change in learning and teaching methods.

**Benefits:**

- Students are highly engaged in the learning process and there are improved learning outcomes as a result.
- Information literacy skills are learned and used at point-of-need.
- Librarians are equal partners with subject faculty in the development and implementation of curriculum.

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