

DANCING WITH PROBLEM-BASED LEARNING: THE PERFECT PARTNER

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INTRODUCTION

Problem-based learning (PBL) is a pedagogy that requires critical thinking, problem solving, and information literacy skills. In short, PBL is a perfect partner for library instruction. But what is the best way to coordinate your efforts with those of faculty so that students get the maximum learning benefit? Look for the commonalities – the basic dance steps that everyone can follow.

Both PBL and information literacy share in common the five objectives from the ACRL Information Literacy Standards. These objectives and their specific outcomes point to what students should be able to do: determine the kind and quantity of information needed (what do you know v. what you'd like to find out), access the necessary information, evaluate information, use information to accomplish a purpose (solve a real world problem), and access and use information ethically and legally.

PBL has the potential to increase student retention of subject knowledge and information literacy skills through application by working with faculty on problem creation, determining roles (who leads, who follows), and providing the right level of research support for students.

PROBLEM-BASED LEARNING AND INFORMATION LITERACY

Finkle and Torp (1995) stated that problem-based learning is a “development and instructional approach built around an ill-structured problem which is messy and complex in nature; requires inquiry, information-gathering, and reflection; is changing and tentative; and has no simple, fixed, formulaic, “right” solution.”

Instead of the usual term paper assignment, students work in small groups on a real-world problem. This approach helps students retain and apply course content as well as teaches them how to approach and produce solutions to any problem they may face in their academic or personal lives.

A good PBL problem:

- Is engaging and oriented to the real-world
- Is not merely a “task” but a journey
- Generates multiple hypotheses
- Requires in-depth research
- Requires team effort
- Is consistent with desired learning outcomes
- Builds upon previous knowledge/experiences
- Promotes development of higher order cognitive skills

These PBL problem characteristics clearly articulate the need for information literacy.

The *ACRL Information Literacy Competency Standards for Higher Education* define information literacy as a set of abilities requiring individuals to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.” Information literacy forms the basis for lifelong learning and is common to all disciplines and learning environments, and to all levels of education. Together, PBL and information literacy share the bond of learning outcomes. What should we be able to do to be considered information literate or knowledgeable about a subject? At what level? How can we be more honest with students about our expectations? How can we be more honest with students about their skill level? What about retention of knowledge and skill level?

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The ACRL Information Literacy objectives (and their measurable outcomes) are the cornerstone for successful PBL practice:

- Determine the kind and quantity of information needed;
- Access the necessary information effectively and efficiently;
- Evaluate information and its sources critically;
- Use information successfully to accomplish a specific purpose;
- Access and use information ethically and legally.

Various outcomes from these objectives can be found in instructor syllabi and assignments and also in curriculum planning for library instruction sessions. The wording in the instructor syllabus may be different from that which the librarian uses, but these objectives are the shared dance steps between information literacy and PBL.

THE DANCE

Who leads, who follows? The faculty member and the librarian trade off and share in both roles. The faculty member usually makes first contact, with their PBL problem already in hand. Hopefully, faculty will prefer to discuss the PBL problem with the librarian before finalizing the problem to see what possible resources are available for student research. Problem discussion between faculty member and librarian gives the librarian the opportunity to incorporate stated and measurable information literacy objectives into the overall project. A date and time for the library instruction session is set. The faculty member introduces the problem to their students and forms small groups to discuss the problem and the overall PBL process.

A week or two before the library session, the librarian and faculty member should discuss the PBL problem again, exchanging concerns and initial research plans that students may have about the problem. If the scheduling is possible, it's best if the librarian has an in-classroom visit to listen in on each group's plans for research. The librarian should not interject during these listening sessions. The basis of PBL is comprised of students coming up with their own questions and creating a plan to answer those questions for themselves. Student groups identify specific learning issues that they need to research. What do they know or think they know about the problem? What do they need to find out in order to create a solution to the problem?

During the library session, the librarian should play the role of moderator, opening the floor up for general discussion of the PBL problem. A very effective means of letting students take ownership of the session is for the librarian to take notes on an overhead or other medium as each group shares their research concerns or questions. Again, the librarian should not interject at this point. Listening and validating students' research concerns is an important first step in the research phase of the PBL process. The students are your dance partners, too.

Ask students to define their learning issues and articulate their action plan:

- What questions does the problem raise?
- What do you think you know in order to answer?
- What do you need to find out in order to resolve the problem?

It seems somewhat redundant to go through this process, particularly so if the librarian has visited the class prior to the library session. A librarian's first instinct when faced with a new class to teach is to hunt and gather relevant sources and create the ultimate handout. Then the librarian wants to share the ultimate handout to the students at the beginning of the session. But students need to be able to articulate their information needs first before jumping into research. They need to make that connection between what they need versus what research tool will get them there. After the students articulate their research needs, the librarian can demonstrate how to create a flexible search strategy by highlighting key words provided by the students and placing them and their possible synonyms in an AND/OR grid. Give students some time to form more search strategies for their group learning issues, then turn them loose to search through books, articles, reference materials, whatever is appropriate for their questions. Provide a blank worksheet so that students can keep track of their search strategies and take notes on potential sources. Ask the students to find at least two relevant, promising sources and note any subject headings or key words that they might add to their search strategy.

Since the race to beat the clock is always a factor with library sessions, one way to help expedite student access to resources and to extend library instruction past the scheduled time is to create online course research guides. Take that ultimate two-page paper handout and put it in a template on a web page. Focus on the overall process of research. Incorporate transferable concepts. Create links to the databases. Give sample searches for the catalog and the databases. Even more helpful are small screen captures of sample searches from online tools. This may sound like a lot of work, but the time you spend frontloading information into these online course research guides means that you have more time during the session to assist students individually or in their groups. Students might also be more likely to use an online guide than consult a paper handout. Once students land on the online guide, you can simply have them scroll to whatever research tool might be most useful for their particularly learning issue. The screen captures provide a timesaving solution to the "watch me demo this, then you do it" classroom technique. Students can easily look at a screen capture, click on the database link, and then fashion their search to "look like the picture." The online research guides can be linked to the faculty member's web site and/or WebCT space. Alternately, librarians can link to faculty web sites, research plan worksheets, and other helpful materials on the online guide such as how to evaluate and cite sources.

As the students use the course research guide during the session, both the librarian and faculty member circulate among each group providing search tips, help with strategy and tool selection, and encouragement. Depending on how well the session goes and what reaction students have to the PBL task during the initial research phase,

a follow-up library session where groups can get more specialized assistance might be a good idea. Remember, the more contact and discussion you have with the faculty member during this crucial phase the better you can assist faculty with their learning outcomes and ultimately provide a good research experience for the students. Ask the faculty member to require student groups to turn in their research worksheets and strategies as part of the PBL project. Librarians and faculty can look these over together and provide suggestions to help students achieve stated information literacy outcomes.

One additional suggestion about the online research guides is to use a stat counter of some kind to keep track of access to the page. Some stat counters will include not only page loads and unique visitors, but also pathways showing how the users got there, through a web link or search. If students are using a search engine such as Google to find information, and they happen upon the online research guide and click on it, stat counters can let you know what key words the students typed in to get there. Based on this information, you can add helpful tips at the top of the guide or update information to highlight particular resources, again extending instruction past the library session. At the end of the semester, you can send faculty a report on the usage of the research guide.

DANCING WITH YOURSELF: PBL PRINCIPLES FOR ONE-SHOTS

While PBL is a proven pedagogy for better retention of knowledge and application during semester long classes, you can also choose to use basic PBL principles in your one-shot classes. Instead of starting class with a handout overview, put that handout online, let go, and engage students in topic discussion from the beginning. Use what you know about their assignment to get discussion rolling or select a sample topic for the overall subject at hand. Run the session using the two most important research questions: What do you know? What do you want to find out? Become the moderator and take notes on an overhead or other medium to validate their responses and provide visual stimulation. Help them create an initial search strategy with the AND/OR grid and then turn the students loose on the course research guide or library web site. Provide a blank research worksheet so that students can create their own breadcrumb trail of key words and search tools. Don't let students search aimlessly. Require them to find at least two relevant sources for their own topic or for the sample topic. Circulate and encourage each student. In using these basic PBL techniques, you are allowing the library session to be more useful to the students. If you give students the flexibility to form their own path, the opportunity to share what they know, they will take away from the session what they really need. Not what we as librarians think they need. Plus, PBL takes the pressure off of the librarian to "perform" and creates a classroom dynamic that is a whole lot more interesting, engaging, and just plain fun.

SAN ANTONIO COLLEGE FACULTY ON DANCING WITH THE LIBRARY

Dr. Thomas Clarkin, History:

"Those students who availed themselves of the materials available in the library had greater success with the PBL activities in that they located useful information regarding their topic. Students who ignored the instruction tended to have brief bibliographies that relied on Google searches to obtain information."

"I think that many students would not have fared well without guidance from the library."

Carla Mendiola, History:

"Breaking down the research process during class and then providing the research workshops was very helpful. It helped students better understand the research process and how to conduct research in the library."

"Knowing what sources are available to students helps me better shape my PBL expectations. It also gives me more ideas on materials to show them or incorporate into my classes. The library workshops, online guide, and class lectures/activities help reinforce the PBL research message from two different sources, i.e., library and classroom."

Dr. Jonathan Lee, History:

"What I learned is that I have never really addressed the issue of student's learning how to find good information. I must work on that."

"I was worried about their analytical abilities. I should have realized that they need guidance on research abilities."

Dr. Carol Keller, History:

"Students are far more comfortable using major search engines and Wikipedia for quick reference information. But if we are to make them life-long learners in a substantive way, we need to challenge our students to routinely access scholarly materials as their current academic work demands."

"I want to stress how crucial the visual guide has been to student success, not only for visual learners but all learners."

"The key is to tailor each library workshop to course and assignment specific tasks. While this means more work for both librarian and faculty member, the dividend of student success is worth the effort."

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Sample PBL problems, presentation slides and handouts, and participant feedback are available online at the presentation web site:

<http://www.accd.edu/sac/lrc/librms/celita/pbldance.htm>

REFERENCES

ACRL Information Literacy Standards Toolkit: <http://www.ala.org/ala/>

[acrl/acrlissues/acrlinfolit/infolitstandards/standardstoolkit.htm](http://www.ala.org/ala/acrl/acrlissues/acrlinfolit/infolitstandards/standardstoolkit.htm)

Finkle, S. L., & Torp, L. L. (1995). Introductory documents. IMSA partnerships in problem-based learning. (Available from the Center for Problem-Based Learning, Illinois Mathematics and Science Academy, 1500 West Sullivan Road, Aurora, IL 60506-1000).