

The LEADER project

Becoming an information LEADER at Purdue University

by Alexius Smith Macklin and Michael Fosmire

Students and faculty are quickly adapting to electronic information sources as a convenient way of conducting research, doing some quick fact-finding, and even getting up-to-the-minute news reports. Search engines such as Google and Yahoo! are making data on demand a reality, and even a downright expectation. Our academic users increasingly connect to computers in their offices or dorm rooms rather than go to a physical library for their information needs. While the technology saves them from traveling to a remote location, they may actually be wasting valuable time online not knowing where or how to begin an efficient search process.

With the growing volume of conveniently accessible information, "drinking from the fire hose," as the phrase has been coined, user education is more critical today than ever before. The ease with which one can find "something" on the Internet that ostensibly answers students' questions can lead to a state of functional information illiteracy.¹ In other words, many users are able to conduct basic, fact-finding searches but they are not skilled at locating relevant information to solve deeper or more abstract information needs.

The limited skill set students use to solve their information problems continually chal-

lenges librarians to find new ways of convincing the computer-savvy that they still have something to learn about the information-seeking process. In order to create a compelling instruction tool, Purdue University devised the Learner EnABled Digital Environment Resource (LEADER).

Developing LEADER

The LEADER project is a prototype learning tool designed to teach in-depth, subject-oriented information literacy skills as an integrated part of the curriculum. In this learning environment, users are challenged to solve real-world problems by defining information needs, testing and evaluating information retrieval strategies, and developing advanced-level search skills to use in a variety of information storage and retrieval systems. These problems require learners to do more than simple fact-finding on the Web, and, for example, may require the use of online indexes to find literature of a professional and scholarly nature.

While there are many successful online tutorials aimed at first-year students, these tools were designed to teach the basic, non-subject-specific information retrieval for a broad body of popular literature. They do not address the needs of the more advanced user. As students

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grow beyond the orientation level, there is little to help them use the professional literature and information sources in their selected fields of study. Because the structure of scholarly information is different in each subject area, students need to understand which kinds of information resources are most important for their chosen discipline, what kinds of information needs each type of resource can fill, and how they can be efficiently searched and evaluated for quality and relevance. LEADER is a way to reach this advanced-level learner who wants to refine his or her information skills.

Creating integrated tools

Our goal for the LEADER project is to create tools that are integrated directly into course content by providing relevant and interesting, yet complex and fully developed, information problems that require skills beyond simple Web surfing. Identifying these real-life problems requires a unique collaboration between subject area experts and librarians.

To gather the best information possible for this project, the team interviewed and surveyed students, alumni, and employers of students in the School of Science at Purdue University. We asked them to rate the importance of the following skills in their discipline on a scale from 1 (unimportant) to 5 (very important):

- formulate a research question/develop a thesis statement,
- use a variety of information sources, such as books, journals, and the Web,
- use information effectively to complete a project,
- demonstrate an understanding of intellectual property (e.g., copyright and fair use, plagiarism), and
- evaluate resources for credibility and relevance.

The feedback from these questions allowed us to identify typical problem-solving experiences and the information literacy competencies associated with them. From this point, we were able to start collaborating with faculty by identifying where information skills best fit into the course content. We wanted to find a natural fit where information literacy instruction would not disrupt the flow of the regular instruction.

The two most important skills were: evaluate resources for credibility and relevance and use a variety of information sources.

Recruitment

For the beginning phase of LEADER, we decided to concentrate on faculty in the physical sciences and engineering because there was already a relationship between those subject areas and the librarians. We created a list of faculty likely to be interested in learning about information literacy (based on their own use of the libraries or student use of the library for course-related projects) and invited them to lunch in May 2001 to discuss the goals and objectives of the project.

It is important to note that the faculty knew this invitation was selective and not a mass mailing. Out of the 20 invitations sent, we received 8 "yes" responses, with a number of others expressing interest, including 3 people who were not on the original list.

At the lunch, we spent an hour introducing information literacy competencies as a means for raising student-learning outcomes through improved problem-solving and critical thinking skills. At the end of the meeting, two faculty members were ready to start working with us immediately. A number of faculty members expressed an interest in participating in the LEADER project the following spring.

Collaboration

During the summer of 2001, we worked with the instructors to write problems that would be content specific, meaningful to the students, and in need of relevant information to provide possible solutions. The process started with an interview of what specific learning outcomes were expected for the course. We used a modified version of the 22 performance indicators from the national competencies² to help each of the professors decide which were most relevant to his students.

We also reviewed the syllabus with the faculty partner and determined the important topics to be covered, what kinds of assignments were required, and what information skills would be needed to accomplish those assignments. The first pilot project was for an introductory survey course in Earth and Atmospheric Sciences, which is required of all majors. In order to address all of the information competencies requested by the instructors, two of the course lab sessions were converted to information labs.

Showtime

The pilot of the LEADER project was a lab scheduled for 10:30 a.m. on September 11, 2001, arguably not the best time to conduct a meaningful learning experience. Despite the terrible tragedy that occurred that day, classes continued as scheduled. Even though concentrating on the task at hand was difficult that day, the students were actively engaged in our project during the entire three-hour lab. Indeed, as wildly different accounts of the events of that day circulated among the students, it provided them a strong lesson in the need to evaluate information.

In that first lab session, we organized the class into two-person teams and assigned each team a different problem to solve. The classroom was fully equipped with computers and Internet connections for each team of students, a demonstration computer connected to an LCD project in the front of the class, and a whiteboard. Because we were allotted the full three hours, the pilot was broken down into one-hour increments with the following learning objectives for each part.

Part I

After reading various problem scenarios related to the origins of the Earth, the students will be able to:

- develop a question/hypothesis/problem statement by identifying what they already know about the given problem scenario and
- identify keywords for constructing search statements/strategies to test in various search engines.

Part II

By working through problem-solving activities designed to use peer mentoring to teach advanced strategies for information retrieval, the students will be able to:

- construct search statements and test them in a variety of electronic databases,
- conduct peer-review evaluations of the information gathered by classmates, and
- revise search terms/strategies to increase quality of information found.

Part III

After gathering high-quality information resources, the students will be able to:

- extract relevant information from resources selected,
- synthesize information from multiple sources,
- present a coherent, documented, solution to their problem, and
- correctly cite information used.

The legend of the roasted tanner

Following is a sample problem we developed on the ozone layer for the first pilot project.

Did you hear the story about the woman who died as a result of injuries she suffered while using indoor tanning equipment? It seems that the day before her wedding, she decided to go for the bronzed bride look. She spent the day going from salon to salon, tanning for up to an hour at each place.

By the end of the day, her skin was so severely burnt that she later died from those burns.

Do you believe this story? Read on.

According to a report published in 1995 by the U.S. Global Change Research Information Office, the "hole" in the ozone layer will have serious impacts on human health:

Any persistent drop in the amount of protective ozone resident in the stratosphere will increase the amount of solar ultraviolet radiation that reaches the surface of the Earth, at the risk of direct and deleterious effects on human health; that much is known with certainty. Likely effects include eye damage, higher levels of malignant melanoma (skin cancer), and weakened immune systems causing increased potential for infection and disease.

As a team of writers for the university's newspaper, *The Exponent*, you are scheduled to submit an article, right before Spring Break, on whether or not tanning beds offer a safer solution to the beautifully bronzed than a day at the beach. Organize some facts to present to the editor on this piece.

Outcomes

The students presented the results of their research to each other in the lab the following week. Since they concerned different topics, the presentations stayed interesting for the entire class, and having students do peer evaluations of each other's presentations also kept them focused.

Initial reactions to the LEADER project have been extremely positive. We were able to reach most of our goals easily and measured the effectiveness of the session with our learning objectives and anticipated outcomes. At the end of each of the labs we knew that the students were using electronic databases they never used before, they had been challenged by their peers to reevaluate their information needs and revise their search strategies, and they were organizing and presenting the problem-solving and information-retrieval process thoroughly.

The faculty members involved also were pleased with the students' initial performance outcomes (on both the information exercises themselves and a final term paper for the class). In our formative evaluation, we noted that the pilot project was more analog than digital, as we experimented with format and using the problem-based learning approach. Our main focus was in the development of a sound instructional design.

Our next steps for the LEADER project are to use the problems, learning objectives, and group problem-solving instruction format created in this pilot test as templates for a scalable, completely online learning environment. This environment will contain instructional content overlaid by subject-specific information problems. Subject faculty and librarians may use it as a toolkit to devise their own information problems or borrow scenarios already tested. Since peer learning is a valuable component of the problem-based learning approach, real-time and asynchronous communication tools will be built into the environment.

Notes

1. David Majka, "The conqueror bookworm," *American Libraries* 32.6 (2001): 60-63.

2. ACRL's "Information Literacy Competency Standard for Higher Education" can be found at <http://www.ala.org/acrl/ilcomstan.html>. ■

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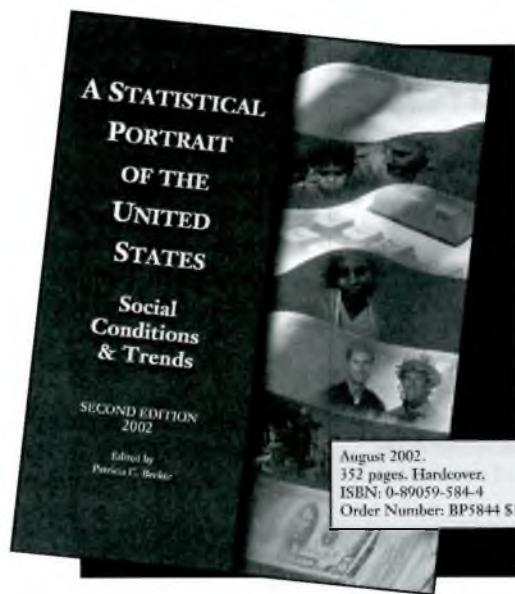
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