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The Librarian as Teacher: Instructing the Next Generation of Information-Literate Scientists at Case Western Reserve University

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Abstract. Scientists have nearly unlimited access to research directly at their desktops. Troubling to us as librarians is the scientist's ability (or inability!) to effectively access this information. The University Library at CWRU, like most academic libraries, has been faced with declining gate counts and reference transactions. In order to ensure that our students will know how to use the digital materials that we make available to them, we have implemented a primary initiative to increase our teaching role on campus. We aim to create an information-literate community that knows how to navigate the new digital library. Library instruction to academic departments in the physical sciences is an unusual mix, but one that we have had success with at CWRU. In order to reach this group of information seekers, we have had success by using the following methods to reach our community:

- Partnering with other constituencies on campus
- Creating new ways to provide instruction
- Assessment of teaching tools and student learning

By taking the library and our instruction to the physical sciences community, we are in the process of creating information-literate students who will be more successful as graduate students and researchers in the future. With this program, our role has changed from traditional librarian to teacher.

Scientists have nearly unlimited access to research directly at their desktops. Troubling to us as librarians is the scientist's ability (or inability!) to effectively access this information. The University Library at Case Western Reserve University, like most academic libraries, has been faced with declining gate counts and reference transactions. In order to ensure that our students will know how to use the digital materials that we make available to them, we have implemented a primary initiative to increase our teaching role on campus.

Library instruction to undergraduate students in the sciences is not a common mix. A search of *Library Literature* reveals only a few papers written on the topic, most of them project reports much like the one I am giving today. For example, Cecelia M. Brown and Lee Krumholz describe in a recent issue of

College and Research Libraries an instruction program that they designed for a geomicrobiology course at the University of Oklahoma (Brown & Krumholtz 2002).

In another article, Michael Fosmire of Purdue University provides us with very telling statistical information regarding marketing instruction programs to physics departments (Fosmire 2001). The statistics are based on a survey he gave to librarians via PAMnet and give a good picture of current (2000) instruction programs at physics libraries in North America, based on the perceptions of librarians. It shows that most instruction to physics students is directed to specific resources rather than more conceptually based, information-literacy instruction. Fosmire then follows with recommendations of how to market an instruction program to physics faculty members.

The reason Fosmire sees a need for actively marketing instruction to physics and other science departments is based on a survey of faculty in science departments prepared by Gloria Leckie and Anne Ferguson (Leckie & Ferguson 1999). This survey showed that a startlingly low number physics and astronomy faculty saw any need for bibliographic instruction for their undergraduates. According to their data, only 28 percent of faculty saw a need for instruction in the first two years of undergraduate study, with a higher number, 67 percent, seeing a need for instruction to upper level undergraduates.

At CWRU we have made a conscious decision to invigorate our information-literacy program aimed at the undergraduate student population. As a school that has traditional strength in the sciences and engineering, this meant devising a way to reach the students in these disciplines.

I was fortunate in the summer of 2000 to attend the ACRL's Information Literacy Immersion program. This week-long training program is designed to not only clarify the *Standards of Information Literacy for Higher Education*[1], but also to help librarians implement these standards, from the front lines of teaching library instruction to the more complex process of program development.

On returning from the Immersion program, and with the strong support of the library administration, I set about implementing the practical teaching methods that I'd learned, as well as meeting with myriad groups on campus trying to garnish support for our instruction goals.

It became clear that the more people we met with, the more acceptance we gained for integrating the Information Literacy Standards into the academic curriculum on campus. Among the first people we met with were academic deans. These people had the broadest view of the current and projected curriculum on campus and were quite helpful in pointing us to appropriate faculty members and committees who they thought might best benefit from our input.

I also was invited to speak about information literacy to a faculty forum on campus, the University Center for Innovation in Teaching and Education (UCITE). This forum is specifically designed for faculty and others on campus to discuss the connection between teaching and scholarship. Indeed, UCITE's statement of philosophy says that through their programs, faculty "aspire to develop student skills and attitudes which will support a lifetime of discovery and learning." This statement meshes particularly well with the Information

[1] `http://www.ala.org/acrl/ilstandardlo.html`

Literacy standards. The introduction to ACRL's document that outlines the standards states "[information literacy] is not just for college students but all of us, as professionals, in the workplace and in our personal lives. Being information literate ultimately improves our quality of life as we make informed decisions when buying a house, choosing a school, hiring staff, making an investment, voting for our representatives, and so much more."

While presenting to the UCITE group, I was fortunate to make contact with a faculty member from the Physics department, Professor Mano Singham. He approached me to work with him in creating a better assignment for his freshman level physics courses for non-majors. While apprehensive about how I would go about instructing a large group of undergraduate physics students, I accepted his offer.

Professor Singham has taught the two semester-long introductory courses, Mechanics and Electricity and Magnetism, for several years. Each semester he assigns a paper for the students to write in groups. The course includes 180 students per semester, and the papers are written in groups of three or four students each. He assigns the topic, which in the first semester is quite focused and the second semester more open-ended. The students are then asked to research and write a paper on the topic, written to an audience of the educated general public. His hope in inviting me to instruct the students on basic research skills was that the students would move beyond using their textbook, class notes, and Google searches for their research.

The task of teaching some of the lower-level information literacy skills to such a large group of students was not an easy one. While agreeing that students would benefit from learning these skills, Professor Singham was not willing to give me significant class time to teach. This was a double-edged sword for me as teaching librarian. I was disappointed at missing the opportunity to use some of the teaching skills I'd learned at Immersion, but recognized the difficulty of doing so to a class of 180 students. Instead I fell back on something librarians have done for decades- created a handout (and web page) that led the students through the thought process and typical sources that they could use for their research. They were then encouraged to consult with me on their own for more help, which many did. I gave a brief ten- minute introduction to the whole class, so that they would recognize me.

The most positive aspect of this collaboration was Professor Singham's request that I assign a portion of the grade for the students' final paper. The students were required to bring a draft of their paper to me so that I could evaluate the sources that they used. After this consultation, they returned with the final draft and I assigned a grade based on the types and variety of sources that they used.

In the two fall semester sessions of this course, the initial research done by students for their papers has been uniform in its homogeneity. Despite being led to reputable sources by my handout, a large number of them brought me papers with references that were nearly all web page URLs or their textbook. My instruction to them, then, took the form of one-on-one sessions in my office as I was reviewing their drafts.

An example of a paper topic was Mach's Principle and how it uses the concept of inertial frames. Students brought me papers with reference lists that

looked like the first ten hits that they found doing a Google search for "Mach's Principle". While some of these sources were reasonable, many were not. Several were authored either anonymously or by egotistical pseudo-scientists. This afforded me the opportunity to give the students a brief lesson in web page information evaluation, a skill few of them had.

The students were also unaware that, as fast and easy as Google seems, there are equally fast and, more importantly, more effective sources at their disposal in the library. One student had used an anonymous web site as a source for biographical information on Mach. I explained to him why this is not a reliable source, then walked him out to the reference shelf and showed him the *Dictionary of Scientific Biography*, which not only gives a thorough four-page biography of Mach but also has three pages worth of bibliography.

For the second semester of this course the students were asked to research an aspect of electricity or magnetism that affects or is affected by living systems. This cross over between physics and biology was particularly interesting from the instructional point of view, as it afforded me the chance to show the students how different databases provide different access to a broad, cross disciplinary study. By this point, the students knew not to rely on web search engines for their primary research but were savvy enough to use it where appropriate- for example to find product information on magnetic resonance imaging equipment.

For this early stage of information literacy instruction we have begun implementing an online tutorial. Using content created by the University of Texas system entitled TILT[2], we will administer the tutorial to a new freshman seminar program that begins in the fall of 2002. This seminar, with the common theme of "The Life of the Mind," is taught by faculty drawn from each college in the university, from the department of philosophy, through biology, engineering and economics. The goal of my involvement in this seminar approach to learning is to teach the incoming freshmen some of the basic tenets of information literacy, providing a basis on which to teach them the more specific research skills that they will need for their given major as upper level undergraduates.

Along with its attractive multimedia and interactive method of delivering content, the TILT tutorial package also includes quizzes that facilitate assessment. At CWRU, we implemented the TILT tutorial via Blackboard, a web based tool for creating online course content. Using Blackboard allows us to track student use of the tutorial as well as student performance on the quizzes.

For librarians providing instruction, assessment can be a difficult piece of the teaching puzzle. Frequently we rely on feedback from the course instructor to know if the instruction we have provided has been worthwhile. At CWRU we have attempted to be more proactive in the assessment of our instruction programs. In the case of the online tutorial, assessment can be measured statistically by tracking student scores on the quizzes. In testing the tutorial during the spring of 2002, I used the tutorial as a pretest of student skills for a subset of undergraduates. Student performance on the quizzes then guided my choice of topics that I covered later in the semester during an in-class instruction session.

In the case of the large group of undergraduate physics students, I was able to more closely assess how the students used what I taught them by assigning a

[2] `http://tilt.lib.utsystem.edu/`

portion of the grade to their papers. Since I reviewed and graded the sources used while the student was in my office, I used that time to interview the student about his information finding process- how he went about building his list of sources.

Feedback from the faculty is valuable as well. In the case of my work with the physics students, the professor commented on how the papers showed a remarkably broader and better level of research than in previous semesters. Finally, Professor Singham and I are in our fourth semester of working together collaboratively, certainly a sign that he finds the collaboration worthwhile.

By taking library instruction to the community of undergraduates in the physical sciences, we are actively encouraging this group to become information literate. By learning these fundamental skills, they will be more effective researchers for their immediate needs of research papers and senior projects, as well as more successful in their graduate studies or workplace careers.

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