Integrating Research Instruction into the Curriculum: A Model for the Chemical Sciences

Results of the Retreat at the Kellogg Biological Station August 7-9, 2001

Problems:

1. Chemistry majors struggle with writing introductions to the Senior Independent Projects (SIPs).

2. Because the course sequence for the Chemical Sciences is fixed due to requirements for certification by the American Chemical Society, there is no place to insert research instruction into the Chemical Sciences curriculum.

3. Students at Kalamazoo College go on Study Abroad for most of their junior year, so there is little time to teach these students research skills before they begin their SIPs.

4. The Chemical Abstracts database is too limited in scope for an accurate introduction to the Chemical Sciences.

Needs Assessment:

Kalamazoo College must insert a research instruction component into the Chemical Sciences curriculum while expanding the resources available to Chemical Sciences students and faculty.

Solution:

A hybrid model of research instruction through which students experience face-to-face teaching with a librarian (supplemented with the Discus discussion board) and a Web tutorial on developing research skills that includes a science database component.

Logistics:

Since there is no existing slot for research instruction in the Chemical Sciences curriculum, it is necessary to include this training in an existing but flexible location: the Junior Seminar. This course is required for Chemistry majors, and students take it in the spring of their junior year before they begin their SIPs but after they have returned from Study Abroad.

Typically one of the first sessions in the Junior Seminar consists of a speaker's presentation. Students will be asked to gather information resources they could use to write an introduction to this presentation. Though students will not be obligated to write this introduction, they will be required to produce a bibliography of sources. Coupling reference instruction with an assignment reinforces the research skills students learn in a concrete way.
Students will then meet with a librarian for three sessions during the quarter. A librarian will teach the seminar the session after the speaker's presentation. S/he will discuss research methods and other issues with students to enable them to begin their exploration of the literature. S/he will also introduce students to the Web-based tutorial. This tutorial will have two parts: a general introduction to research and an introduction to a discipline-specific resource (for the Chemical Sciences, this resource will be the SciFinder Scholar database). Students will complete the tutorial before the second meeting with the librarian. Students will be able to contact the librarian outside of class via email and the Discus discussion board. The librarian will guide students in their research through two follow-up class sessions during the Junior Seminar time.

Advantages:

1. This model reinforces concepts students learn in their First Year Seminars (FYS). Though librarians teach research skills in these sessions, librarians may not reach these students again in any systematic way without intervention such as this project.

2. Research instruction, especially in the spring term of a student's junior year, will help students write their SIPs.

3. The results of these sessions can be saved and organized for a student's electronic portfolio, showcasing his or her accomplishments and research skills.

4. Students learn to navigate SciFinder and use it to gather resources.

5. SciFinder is not only an asset for chemistry, but for biology, mathematics, physics, and other areas of the sciences as well. This may be a selling point considering its expense.

6. Students will be able to access the Web-based tutorial at any time and place they have Web access.

7. The general portion of the Web-based tutorial will be flexible enough to be used over several different disciplines.

Project Assessment:

Several methods of assessment are possible:

1. A survey instrument dealing with aspects of the class

2. A quiz mechanism integrated into the Web-based tutorials

3. Monitoring for a significant increase or decrease in student participation

4. An assessment of whether SIP introductions improve
Issues:

1. Unfortunately, since the Junior Seminar is not a graded class, participation in this project will be voluntary. However, since the instruction presented will help students with their upcoming SIPs, students interested in improving their research skills will likely participate.

2. Finding funding for SciFinder could be an issue. This database, like other science databases, is quite expensive. Though SciFinder is useful across several disciplines, it requires stable funding that will exceed the timeline of this grant.

Conclusion:

This project addresses skills Kalamazoo College students should develop over all four years, from their FYS to their SIP. The tutorial will be scalable enough for students at various skill levels to benefit from it and flexible enough to enable other disciplines to take advantage of it.