

Maximizing Audience and Student-Perceived Relevance: Teaching Information Fluency in Introductory Biology Courses.

Davidson College Collaborators

Karen Bernd, Asst Professor, Biology Department

Frank Molinek, Science Librarian

Mur Muchane, Director of Instructional Technology

Victoria Statler, Davidson College, Class of '03 Biology Major

Abstract: We will create web-based information fluency modules for use in Principles of Biology I, an introductory biology course required of Biology majors and pre-med students at Davidson College. Topics covered would include: search skills and strategies for discipline specific databases; use of the WWW for information gathering; critical evaluation of data and information; components of scholarly communication in the sciences; and ethical and legal issues of copyright, citations, and plagiarism.

Design and development the IF module would be a done in collaboration by a team consisting of the faculty member responsible for the class (K. Bernd), a science librarian (F Molinek), an instructional technologist assigned to the Biology department (M. Muchane), and two students. The students would represent both a naïve information user (a freshman who has not yet taken the course—chosen fall '01), and a more sophisticated information user (an upper level biology major who has taken the class, Victoria Statler '03). Bio111 is currently structured with a weekly lab which has surplus time allowing for incorporation of an IF component. Either the faculty member, or the science librarian would introduce topics. This would be followed by time in which the students could work on the online module. The module would be created using Dream Weaver and Blackboard software. Assessment would be provided on three tiers; one during module development, a second as the modules are included in the curriculum, and a third as it used by more class sections. After effectiveness in the Davidson College Biology department has been assessed the modules and underlying approach will be presented to other departments at Davidson College via a campus-wide workshop. The modules will be available to other ACS institutions via guest access to our Blackboard site. The project will be further disseminated to ACS and GLCA member institutions, as project leaders will apply to present an ACS technology workshop.

Rationale:

In an age of ever-expanding knowledge and technology Information Fluency (IF) is a necessity. The dilemma is when and how to introduce IF. The students will not appreciate the relevance of (or remember) a broad based introduction included in first year student orientation and a departmental senior seminar will be 'too late' and not reach enough students. The best approach is to include discipline-specific modules in required introductory courses like Principles of Biology I (Bio111). The purpose of this grant is to develop on-line modules that introduce information fluency in Bio111 at Davidson College. Further investigation of lecture material in exercises developing IF will teach technological skills and increase comprehension and critical analysis. Since Bio111 is a

requirement for all biology majors and all non-majors applying to medical school the skills would be delivered to a wide audience at an early stage in their academic career.

One other potential problem with an IF project is that the product developed is suitable for one faculty member's teaching style but not transferable to another professor's classroom. Since there are five sections of Bio111 per academic year, each taught by a different faculty member, Information Fluency modules included in this course will 1) reach a wide audience, 2) be 'student-tested', and 3) allow the modules to be refined so that they are not 'instructor specific'. In this manner the final product should be easily incorporated into the curriculum of other Biology departments and the module structure provide a prototype for use by other science and non-science departments.

Description:

I have often told my students that biology majors should get language credit. We certainly don't talk like other people do! Along those same lines scientific writing is a different genre than that of other disciplines. Different writing and referencing conventions, a 'foreign' vocabulary, and an exponentially increasing information pool make Information Fluency critical. Include in that pool navigating multiple databases and critiquing both paper sources and websites of variable veracity and Information Fluency skills become not only important for success but also essential for academic survival.

To be the most beneficial survival skills should be learned in the context of a known and safe environment. To provide the greatest degree of success survival skills should be learned early in a relevant setting and practiced often to ensure that when the need arises the methods are second nature. Our project will accomplish these goals by introducing students taking Principles of Biology I (Bio111) to the skills needed for information fluency. Bio111 is a prerequisite for all upper level biology courses and therefore is the first required course for all biology majors. The course is also a requirement for entrance into medical school and is therefore taken by a significant number of non-majors. By including instruction in Information Fluency in Bio111 a large number of students will learn the skills early in their college career.

The IF modules will have a DreamWeaver front-end and Blackboard-based units. The online format not only reinforces exposure to the technology but also affords ease of access (Davidson College is 100% wired), ease of communication (Blackboard includes listserv functions), immediate feedback (Blackboard allows online exercise evaluation), and ease of dissemination. Six modules will be developed. The topics covered will include: an introduction to the technology; search skills and strategies for discipline specific databases; use of the WWW for information gathering; critical evaluation of data and information; components of scholarly communication in the sciences; and ethical and legal issues of copyright, citations, and plagiarism. The modules will be created during summer 2001 by a team consisting of a biology professor, a science librarian and an instructional technologist. They will be further developed during fall 2001 in collaboration with two students, a 'sophisticated information user' (junior biology major) and a naïve information user (first year student). The students will take and assess the modules for both delivery and content and will be actively involved in revisions. The

final product will also include pre- and post- tests for assessment and an online instructor's manual to provide added resources and tips for professor's wishing to adopt or adapt this approach. After this stage of development the modules will be included in the curriculum of Bio111.

All 5 Bio111 lecture sections (10 laboratory sections) use the same study guide approach. Topics are introduced as case studies and underlying principles are discussed as they pertain to those case studies. Laboratory sessions include directed, novel experimentation in which students test the theories and principles discussed in class. This format is ideal for integrating the instruction of IF skills in a 'relevant and safe setting'. The laboratory sessions include ample time to introduce the topics and to allow the students to access the modules. The case studies used in class will be explored further in the IF modules and the skills will be immediately applicable to preparing for class, laboratory reports and presentations.

Evaluation and Dissemination:

The effectiveness of the IF modules will be assessed at 3 levels. At the first level student collaborators will complete the modules and provide feedback on clarity, content and effectiveness. After revision the modules will be course tested in one section of Bio111. At this second level evaluation will consist of pre-tests, evaluated exercises within the module and post-tests as well feedback on student perception of the modules. The modules will be made available to other instructors of Bio111 and the third level of assessment will include the students and faculty from up to 5 sections of the course. In this manner the course modules will be refined both for their ability to be delivered by different professors and for their effectiveness.

Developing skills in Information Fluency necessitates computer-based activities. The Bio111 modules will be web-based using the commercially available programs DreamWeaver and Blackboard, a Web server-based software that supports coursework being adopted for campus wide use in April 2001. Access to the DreamWeaver front end will require web access and a URL. Access to Blackboard modules will require a guest password that will be provided to faculty at ACS and GLCA member institution via an email link from the homepage. Instructions for using the modules will be provided through an instructor's manual (provided online) and through workshops run by the project leaders. The first workshops will be held at Davidson College to present the modules to the Biology faculty and Davidson College Faculty. Project leaders are also applying to direct an ACS Technology Workshop (2003) after the modules have been further course tested.

Proposed Timeline:

Spring 2001- Blackboard introduced to Davidson College (April),
+K Bernd Participating in Writing Course Workshop at Davidson College (May),
+K Bernd Participating in Blackboard Workshop at Davidson College (June)

Summer 2001- K Bernd learn DreamWeaver and Blackboard.

+IF modules developed by K Bernd, F. Molinek and M. Muchane

Fall 2001- Second student participant recruited from incoming first year students.

+IF modules revised through input of two student participants. Student participation includes taking the modules and meeting with leaders to provide comments on content, style and delivery style.

+IF modules revised in consultation with student participants

**Completed modules and instructor's manual available online

**Instructional Technology Seminar Series Workshop presenting modules and their preparation to Davidson College

The following portion of the timeline is outside the scope of the initial grant period but is included to indicate the steps planned to fully integrate the IF modules into the curriculum and disseminate the finished product.

Spring 2002- IF modules included in laboratory session of K Bernd's Bio111 section.

IF modules revised as needed after 'course testing'

Fall 2002- IF modules included in Bio111 sections taught by other professors.

Summer 2003- ACS technology workshop presents strategies, use and assessment of IF modules to members of ACS and GLCA members