The UC-WISE project
Mike Clancy and Nate Titterton, project directors

Background
The UC-WISE project (University of California Web-based Instruction for Science and Engineering) aims

- to provide technology and curricula for laboratory-based higher-education courses that incorporate online facilities for collaboration, inquiry learning, and assessment;
- to allow instructors to customize courses, prototype new course elements, and collect review comments from experienced course developers.

The UC-WISE system includes a database of annotated learning objects, served by linking to the WISE learning environment developed in the School of Education, plus portals into the database for students, instructors, and master curriculum developers. Activities provided by WISE and used in a UC-WISE curriculum include online discussions, programming exercises, reading of Web-delivered text, reflection notes, journal entries, quizzes, and “gated collaborations” where students critique their peers’ responses to a seed topic. Instructors may view some student work (e.g., quiz responses and collaboration activities) in real time.

We have so far produced lab-based UC-WISE curricula for three courses. CS 3 has been run in a lab-based format since spring 2003. More recently, we have piloted lab-based curricula for CS 4, a new Java-based introductory programming course for engineering majors, and for CS 61B; the “beta version” of the CS 61B curriculum was run in fall 2005 for all CS 61B enrollees. We have support from the National Science Foundation to develop UC-WISE curricula for introductory and intermediate programming courses outside Berkeley, and are working with colleagues at three other U.C. campuses (UCI, UCSD, and the new U.C. Merced) on this project.

Research directions
Several research questions have emerged our experience thus far with UC-WISE curricula, and we are collaborating with colleagues in the School of Education to find answers.

- Students in UC-WISE courses engage in a much wider variety of activities than their counterparts, for instance, focused discussions and gated collaborations. What roles do these activities play in student learning, and what value added do they provide?
- UC-WISE provides a number of ways for students to get immediate feedback, both from the lab instructor and from the learning environment via a “scripted assessment” tool. How do the two compare in their effects on student learning?
- The rich variety of activities in a UC-WISE course has revealed student misconceptions that we had not known about before. What other misconceptions are students encountering, and how can they be dealt with?
- What questions are best suited for use with online collaborations? How do these collaborations compare to face-to-face collaborative activities among students?
- There is some evidence that UC-WISE courses differentially benefit some groups of students, e.g. females. Is this true? Why?
- What other tools or activities might be usefully added to the UC-WISE framework?
Development projects

Work is in progress to solidify the UC-WISE system for export to other institutions. This work involves numerous development projects:

• an overhaul of the user interface of the student portal;
• reorganization of the learning object data base to accommodate the open-source Sakai learning management system infrastructure;
• design of an authoring interface for learning objects in the UC-WISE data base;
• design of an interface for prospective instructors that allows browsing and a “critical review” facility for course components;
• design of an interface for real-time analysis of student progress and exercise completion.

In addition, there is ongoing development of tools that allow lab instructors to better assist their students, as well as a scripted assessment tool for Java programming.

Much of the development is done in PHP and SQL, with some done in Java and Javascript as well. CS 160, 169, and 186 may provide useful background, depending on the project.

Contacts

For further information, contact Mike Clancy (clancy@cs) or Nate Titterton (nate@socrates).