

The PRAXIS Wisconsin project is a UW-System endeavor involving faculty, students and technical support in the creation of innovative teaching and learning materials referred to as digital Learning Objects (LOs). These LOs are self-contained online applications that have features which allow for a variety of learning styles and are delivered in a well-designed format that is easy to use and adheres to the latest digital standards (see sidebar).

An Evolving High-Impact Content Development Process:

The current design of the learning object template was developed at the Advanced Distributed Learning Co-Lab in Madison. The Co-Lab partnered with a team of educators in the Madison area to create a dozen example LOs but found that the creation and design of these LOs was time consuming and expensive. This is where the PRAXIS Wisconsin project comes in.

This past summer (2006), a grant from UW-System provided support for the development of a dozen teams to work on LO creation. This past fall, the teams created about thirty LOs in mathematics and science. This production model not only creates useful educational materials, but it also has a large impact on the team members that help create them. Both the faculty members involved and the student content writers have enjoyed the process of creating the learning objects. Two models were used wherein group sessions were held as undergraduate research or where content was development as a class writing assignment. The best student materials would be identified and the author would be invited to put the materials in the format needed in the LO design model.

While the end-product of these activities is a high-tech set of learning materials, the process of creating the content does not require a great deal of technical skills. The faculty team leaders and the students are provided templates and tutorials that aid in the formatting of the content.

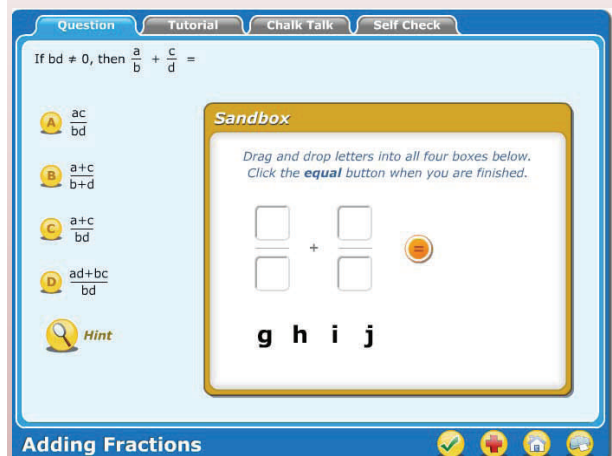
The other portion of the LOs that the teams need to focus on is the Chalk-Talk. The teams create a script that describes both what should be written and what should be said then one of the members of the team will enter a sound booth (see photo on next page) and record voice and hand movements for the lesson.

Preliminary assessment indicates that the students have enjoyed all aspects of the process - the teamwork, the in-depth study of material that they may one day teach and the use of technology. The faculty members involved have also found the project very rewarding. Above all, the faculty (cont)

PRAXIS Wisconsin Learning Objects

The Question option includes multiple choice answers that are similar to those found on the PRAXIS exams (see figure below). If the student chooses the wrong answer, they receive mistake-specific feedback and can investigate the rest of the learning object to learn more. They may request a Hint at anytime. The Sandbox feature allows students to investigate a topic or concept (repeatedly) using a high-tech manipulative interface designed specifically for the given problem.

The Tutorial is similar to an animated textbook presentation of the material, showing the reader how the various pieces of the content fit together to address or solve a problem. The presentation of the material is clear, concise and easier to understand and retain than most textbook passages.



The Chalk-Talk is a presentation that simulates the classroom experience. It includes a handwritten explanation of the solution to the problem, together with a voice-over, allowing for further explanation of the key ideas. Whenever appropriate, the Tutorial and the Chalk-Talk approach the problem using different techniques.

And finally, additional Self-Check problems are added in, allowing the student to test his/her newly acquired (or reacquired) skills or understanding of a concept. At any point in the process, the student may revisit other portions of the easy-to-navigate learning object to review some important detail. Upon completion of the problem-based digital learning object, the student should have a lasting understanding of the solution, process and related material. ■

Chatting With a Student PRAXIS Developer

Kelly Holmstadt, a junior at UW-L, has been working this year on the Praxis II project with Dr. Hoar. Working collaboratively with other math and math education majors, Kelly notes, "What's great about this program is that we work cooperatively with our professors. So it's more like our professors are our peers. They are also working on this." What drew Kelly to this project was that it has auditory, visual and kinesthetic components. "That's the key in all of my education courses," she says. "The kinesthetic part on the main page of an LO allows students to play with part of the problem, the "Sand Box" we call it. They can play with it and manipulate the problem. The ChalkTalk is more audio and the Tutorial is more visual so they all have aspects of learning how to learn."

Kelly's main focus has been working with the tutorial component of the program. She says that this has helped her think about students' prior knowledge and the need to make math learning "more animated."

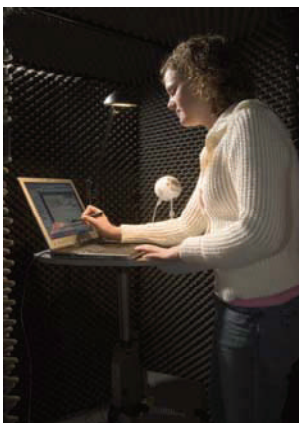
Kelly plans to be a math teacher when she graduates from UW-L. Preparing to student teach in the spring of '08, she reports that she learned a lot from her involvement with this project that has direct implications for her future classroom. Most importantly, she notes the effective use of technology to teach and the need for keeping up with technology. Kelly stressed the importance of learning how to use media effectively. She also highlighted the importance of understanding the background knowledge of each student. "I learned about how much background knowledge students need to know before they can even get to the point of doing some problems. It taught me to be more creative. It really enforced much of what I am learning in my education classes.

She notes that her course work in Educational Media was vital in giving her the tools to design effective tutorials. But she says, "Even if I get a job in a school that doesn't have much technology, it makes me think how you write on the chalk board."

When asked what other courses helped her with this work, Kelly says, "I really drew on my reading courses. Students might not know the vocabulary. You have to identify terms that are used every day rather than terms that a math major would use."

But, according to Kelly Holmstadt, the most valuable learning experience was "working cooperatively with faculty." ■

Math, Science & Education Faculty at the Forefront With Electronic PRAXIS Project (cont)



members involved in the project enjoy working with the students on a scholarly research project that will have a real impact on both the team members that create the LOs and on the students that will later use the LOs.

From Project to UW-System Institute:

This spring, UW-La Crosse has been asked to take steps leading to the creation of a new UW-System Institute that further expands the impact of this project. The new institute, titled the *Institute for Innovation in Undergraduate Research & Learning (IIURL)* will have the following

mission: "To develop, foster and support innovations that use digital technology to enhance undergraduate teaching, learning and research in the UW-System, and to make very simple the storage, retrieval and sharing of digital content for teaching."

The details relating to the budget and the timeline are still being discussed, but the intent is to secure funding to continue to support content development teams within the System. The LOs developed will not only pertain to PRAXIS but to other areas of need within Wisconsin (e.g., remedial math and science, science misconceptions, placement exams, etc.).

The IIURL Institute will be responsible for the development of assessment mechanisms aimed at measuring the impact on student learning. Also under development is a more convenient means for storing and sharing the completed LOs. The storage and retrieval project, known as the *Wisconsin Federated Repository/Registry* project, will allow for on-line collaboration of the construction of the LOs (providing a common workspace accessible to all members of the PRAXIS teams). In addition, the ADL Academic Co-Lab in Madison has partnered with the Institute to provide ongoing technical assistance.

Faculty & Students Involved:

UW-L Faculty: Eric Brunsell, Education; Tim Gerber, Biology; Robert Hoar, Mathematics; Jennifer Kosiak, Mathematics; Becky LeDocq, Mathematics; Helen Skala, Mathematics.

UW-L Students: Kari Bangtson, Krista Batten, Raemi Brandon, Paige Campbell, Dana Christanson, Robert Clark, Tony Corso, Sean Duncan, Jarod Hart, Kelly Holmstadt, Gina Kaufmann, Kim Kaplinger, Eric Kettenhofen, Aaron Mueller, Katie Nakielski, Ross Needham, Bethany Neumann, Teresa Oyen, Chelsea Simon, Caleb Stracke and Melissa Wiehr.

More Information:

Further information is also available at the project website <http://www.uwlax.edu/mathematics/PRAXIS> and at the related Co-Lab site <http://www.praxiswi.com>. Contact Bob Hoar (hoar.robe@uwlax.edu) if you are interested in getting involved or if you would simply like to hear more about this multifaceted project. ■