



Teresa Bear, Ed.D.

Professor of Chemistry,
Saddleback College

OWLv2 Motivates Chemistry Students to “Own” Their Learning

Teresa Bear has been teaching chemistry since 2007 at Saddleback College in Mission Viejo, California, where she was the 2011 Professor of the Year. While conducting research for her dissertation in 2011 (on the use of interactive technology to improve student success), Teresa found that students who used technology performed better than those who didn't use it. Not surprisingly, she forged the path for teaching with technology at the college. Today, that means using OWLv2 (Online Web Learning), the only online learning and assessment system developed by chemistry instructors specifically for teaching chemistry.

The Challenge — Motivating Students to Move Beyond Memorizing

The majority of Teresa's students are engineering, math, or science majors who are motivated and of high academic caliber. Still, every teacher faces challenges, and Teresa's is getting students to truly engage with the subject matter. “Especially in the sciences, many students are just focused on memorization and recitation. OWL breaks that mold,” she says.

To test OWLv2's suitability, Teresa conducted a non-graded pilot that offered students free access to the online program. About 45 out of 60 students participated, keeping Teresa informed by sending her an email after every chapter to review their experience and tell her what they liked and didn't like. “Approximately 85% of the students loved it,” says Teresa. “OWL became our focal point for higher-order thinking versus regurgitation of lecture material. It forced students to get into the material and dig a little deeper. In the end-of-semester evaluations, students said they thought OWL really helped them learn. I thought so, too. Now all of our full-time faculty is on board and using OWL.”

OWLv2 counts for about 10% of the course grade. Students work at their own pace until they master concepts. Along the way, they can visualize chemistry, get problem-specific feedback, and improve their problem-solving skills. Teresa assigns the Introductory Assignments and Mastery questions, and makes the Introductory Assignments a prerequisite so students learn how to use the system from the start and won't get frustrated using OWL for later assignments. Students can't even begin the first chapter until they work through the first assignment. To encourage persistence, she sets up multiple attempts (maximum of 10). “I don't care as much about the answers as I do about the process. I set up multiple attempts because I want students to spend time figuring out how to do the problems.”

Challenges

- Fostering higher-order thinking and encouraging students to move beyond memorization is an ongoing concern.
- Some students lack the motivation to read the assigned material, and can miss out on important background information necessary for conceptual understanding.

Solutions

- OWLv2 (Online Web Learning)

Results

- Interactive figures and simulations help students visualize chemistry and encourage concept exploration.
- Problem-specific feedback, step-by-step tutoring, and the ability for instructors to set multiple attempts (maximum of 10) encourages persistence that promotes understanding and the development of problem-solving skills.
- Mastery problems feature three-way randomization that encourages higher-level thinking and allows students to practice and understand the underlying chemical concepts before they move on.



“The mastery questions are awesome. They are set up so you can’t just look at them and apply a formula. They force students to go beyond the foundational concepts and really tap into higher-level thinking.”

Teresa Bear

Professor of Chemistry,
Saddleback College

To learn more about
OWLv2, visit: www.cengage.com/OWLv2

Mastery Questions Foster Higher-Order Thinking

Teresa appreciates the way OWLv2 encourages critical thinking. “OWL taps into higher-order thinking and offers a holistic approach to learning, rather than the traditional one-way communication that occurs when students read a textbook or sit in a lecture. Every student has an opportunity to own his or her own learning,” she says.

She continues, “The mastery questions are awesome. They are set up so a student can’t just look at them and apply a formula. They force students to go beyond the foundational concepts and really tap into higher-level thinking. In addition to engaging students to critically think on their own, OWL has allowed for high-level discussions when we meet as a group.” Mastery Learning problems contain questions associated with specific concepts or skills. The chemistry, the wording of the questions, and the numerical values changing ensures student mastery. This three-way randomization allows students to practice and understand the underlying chemical concepts before they gain mastery and move on.

“OWL is also valuable because of the embedding of textbook material. If you tell a student to read a chapter, less than 5% will do so. But with OWL’s interactive ebook, the program integrates relevant chunks of information from the chapter as students are working on a question. Whatever students need is all right there, from tables and charts, to tutorials, to real-time visualizations, and interactive simulations. I found in my research that today’s students are part of the Gaming Generation. They can look at the real-time simulations in OWL and really learn the concepts. They learn best through engagement.”

The OWLv2 experience has been even better than Teresa expected, and she has no qualms about recommending the program to others. “OWL has created more of a partnership between my students and me. So many students don’t take ownership of their learning, and that’s what has been most valuable about OWL. It has transferred the baton back to the students to really manage their own learning and take ownership of how and what they want to learn.”



Cengage Learning is a leading provider of innovative teaching, learning, and research solutions for academic, professional, and library markets worldwide. The company’s products and services are designed to foster academic excellence and professional development, increase engagement, improve learning outcomes, and deliver authoritative information to people whenever and wherever they need it. Through the company’s unique position within both the library and academic markets, Cengage Learning is providing integrated learning solutions that bridge from the library to the classroom. www.cengage.com

Copyright ©2015 Cengage Learning. All Rights Reserved.