The way of the future
Innovative digital lab methods enhance student experience

When they began their fascination with chemistry as undergrads, Marty Ondrus’ and John Crandall’s most important data analysis tools were slide rules. Now, more than 50 years into their careers as instructors, their tools include laptops and a wireless network. But then, they have never been the sort to shun new tools.

First they switched to mechanical and electronic calculators. As those calculators got smaller, more portable and less expensive, they gradually introduced themselves to computers — from punch card mainframes to the Tandy TRS80, to the Apple IIe and IBMs, and finally to the small but powerful laptops they use today.

New lab methods
As UW-Stout launched its digital environment, the chemistry department voluntarily created a section of freshmen chemistry for E科尔学生. “We thought we should take the technology seriously, because it is the way of the future,” said Ondrus, who is the chair of the department.

Fortunately, Ondrus had learned about innovative laboratory methods at a Wisconsin Society of Science Teachers Convention, where a presenter demonstrated software and tools that record and graph data during experiments.

Crandall then developed lab experiments that require students to use software with special sensors to collect data. Their laptops automatically graph the information as they collect it.

“In the old days, gathering it would take more time, and you would never get such continuous, accurate data,” said Ondrus.

Chemistry students use a variety of data collection tools during laptop experiments, including a conductivity probe, a spectrometer, a pH sensor, a heart rate monitor and a temperature sensor.

The software not only helps students analyze the data, but also helps them create lab reports and replay the data collection at various speeds.

“think and work”
As the university begins to measure how laptops add value to the students’ total experience, Ondrus isn’t convinced these new methods help his students learn the concepts of chemistry better.

“It is hard for me to determine how much more they are learning. I don’t know how to measure this yet,” he said. “Laptops are wonderful, and we use them in any way we can, but students still have to think and work.”

Although some of the old methods are just as effective in teaching chemistry concepts, Ondrus pointed out that the technology has made some of them obsolete.

“The graph is showing them, the actual process of creating a graph is only busy work,” he said.

Crandall acknowledged that the technology has the potential to open “new opportunities for understanding,” but ironing out technical troubles can detract from what students learn.

“Instead of focusing on the science that is occurring, at times the user is involved in troubleshooting behaviors. While both are important, I would rather have students analyzing the results of an experiment and the experimental protocol than analyzing computer-related problems,” said Crandall.

Virtual experiments
Crandall expects a time will come when students will learn basic concepts of chemistry through online “virtual labs” at a minimal cost. “Cleverly designed virtual laboratory experiments have the advantages of being safe, accessible 24/7, rapidly repeatable and could even be designed to incorporate a variety of commonly encountered errors that require procedural problem-solving activities,” he explained.

Ondrus is beginning to move a bit in this direction by incorporating film clips of experiments into PowerPoint lectures that he puts on UW-Stout’s e-Scholar portal for his students to view.

According to Ondrus, projecting movie demonstrations of experiments in class is beneficial to his students. “I could perform those experiments in class, but students in the back could not see as well. Also, some experiments are too dangerous to conduct in the classroom,” he said.

Building international friendships
Program helps international students experience American life beyond the university

Currently, approximately 110 international students from some 32 countries are living on or near the UW-Stout campus. To help these students become more comfortable in our community, the Office of International Education organizes a friendship host program.

Unlike typical international high school home stays, international students involved in the friendship host program do not live with their host.

“Being a friendship host isn’t a lot of work or a huge time commitment. It is really just opening yourself to a guest from another country. What you put into it, you gain tenfold,” said Vickie Kuester, who runs the program.

The program offers international students the opportunity to experience firsthand American life beyond the university. They see American homes, eat regional food and become part of family customs. Having a host family also helps the students speak English more comfortably.

In addition, friendship hosts help students navigate the community. Most international students do not have vehicles. Since Menomonie does not have a bus system, they find it difficult to travel to the north side of town to purchase personal items.

“A host is someone to call on when they need assistance, or when they just feel like getting out of the dorm environment for a while,” said Kuester, who is associate director of International Education.

Kuester pairs the students and hosts based on the interests and needs of both. International students who wish to have a friendship host fill out an application form, listing their field of study, special interests and when they would be available to visit with their friendship host. They also write down anything about themselves or their country that they think their host should know, such as dietary restrictions, customs or their religions.

People who want to host international students fill out a similar form.

Donna Otto, UW-Stout Human Resources, and her husband, Jerry, hosted Pallavi Joyappa, a student from India who recently earned her master’s degree.

Besides taking Joyappa shopping for necessities, the Ottos took her strawberry picking and out to eat at local fish fries. They also included her in holiday family events.

“Christmas was unfamiliar to her, because she is Hindu. But, we had a lot of fun. She was so appreciative of all the decorations and gifts we gave her to open. Christmas is the only holiday I decorate for, so I go a little crazy,” said Otto, laughing.

Through their friendship with Joyappa, the Ottos became acquainted with many other international students. In fact, five of them joined their family for Thanksgiving. They also attended various ethnic meals together.

Before Joyappa graduated, Otto put together a cookbook of regional and all-American recipes for the students. The book contained a chocolate chip cookie recipe that Joyappa requested, and the recipe for the marshmallow angel pie they made after they went strawberry picking.

Otto said she has benefited just as much as Joyappa has from their friendship. Spending time with Joyappa has taught her a great deal about Indian culture.

For example, Otto was surprised to learn that Joyappa’s marriage will likely be arranged for her. “It is possible for her to choose someone herself, but it would have to be someone from her community in India,” she said.

Otto said Joyappa’s attitude and courage have inspired her to seek new experiences. She is impressed that Joyappa traveled overseas to further her education, knowing she could not go home whenever she wanted to. “Pallavi is very brave. She came here, not knowing anyone, at the age of 23. Up until that time, she had lived at home,” she said.

(L to r) International students Mariko Tada, Krongkaew (Kelly) Klatikul, Pallavi Joyappa and Dhiyasa Balakrishman proudly display the eleven pails of strawberries they picked with Joyappa’s host, Donna Otto (second from right).
Helping new students excel
Stout’s First-Year Advising Program eases college transition

To increase student success, improve student retention and enhance advising effectiveness, UW-Stout’s Advisement Center recently initiated the First-Year Advising Program. As a result, seven first-year advisors helped approximately 1,300 freshmen with their college transition.

The new advisors worked with freshmen until spring, when the students transitioned to a faculty adviser in their academic program. “We want freshmen to be informed members of the Stout community. By the time we handed them over to their program directors on advisement day, they knew how to register for courses, track down resources, make connections and set expectations,” said Shirley Murphy, associate dean of students and director of the Advisement Center.

Addressing concerns
In the past, surveyed students and alumni have expressed low satisfaction with advisement. Also, UW-Stout’s first-year experience and college transition.

These facts spurred the university to develop a First-Year Advising Program with the following goals:
• increase first-year retention rates
• improve the quality of the first-year experience
• provide first-year students with consistent information
• develop responsible, informed students
• raise graduation rates

The new program also responds to increased instructor and program director workloads by taking some of the pressure to get new students up to speed off the shoulders of program advisors. The new program will be evaluated in several ways. Student Web-based assessments will let the Advisement Center know how the program can further meet student needs. Retention, probation and dismissal rates will also be compared to those in previous years.

Immediate connection
Student participation in the first adviser meeting on Labor Day afternoon was overwhelmingly positive. Close to 1,200 freshmen met their first-year adviser to learn about important campus procedures, policies and resources.

“Research has shown that if they make a formal connection with the university within the first four to six weeks, they will be more likely to stay. By meeting their advisers so early in the semester, they gained a go-to person who can help them transition and get the information they need,” said Murphy.

All first-year students have a minimum of eight contacts with their adviser, including several face-to-face meetings. In addition, timely e-mails and e-Scholar portal announcements alerted first-year students to important dates, policies, resources and services. Advisers and students are also using the new advisement section of the portal to access program plans, degree audits, test results and course sequencing.

Common experience
First-year students also participated in a common reading experience, called “Into the Book.” During the summer, incoming freshmen read “Into the Wild” by Jon Krakauer. During fall orientation, 1,065 of these freshmen participated in faculty- and staff-led discussion groups.

“The program was declared a resounding success and will be continued next year,” said Murphy.

Early intervention
To be more proactive about meeting student needs, the Advisement Center asked first-year students to take the College Student Inventory, a nationally recognized instrument created by Noel-Levitz. CSI measures a number of retention related areas, including academic motivation, general coping skills and receptivity to support services.

First-year advisers met with freshmen during the first four weeks of class to review key concerns with them and to make specific recommendations to get students started on the right path. “Instead of waiting for a student’s poor academic performance to trigger an intervention, CSI allows us to help them identify potential problems before they occur,” said Murphy.

The Advisement Center now has computer training modules that help students with specific issues identified by CSI. For example, if the instrument indicates that a student needs assistance with taking tests, the adviser may point the student to a computer training session designed to increase test-taking skills.

Bug control
UW-Stout group raises beetles to restore campus wetland

Lynn Peterson, director of grounds maintenance at UW-Stout, has a problem with the invasive plant purple loosestrife. As the president of Prairie Enthusiasts and a former Department of Natural Resources wildlife technician, she is familiar with how the plant has overrun the wetlands of 70 of Wisconsin’s 72 counties. So, when she found it in a small diverse wetland on the south side of the UW-Stout campus, she decided to bug it to death.

Peterson, with the help of UW-Stout grounds staff and four students in UW-Stout instructor Krista James’ biology class, raised Galerucella beetles that are natural enemies of purple loosestrife.

“The DNR has done extensive research to ensure that the bugs will not destroy other plants. So far, they seem to live solely on purple loosestrife,” said Peterson.

Students Kara Duckett, Tiffany Grabow, Carolyn Joseph and Erin Churchill began the project by helping Peterson pull 10 loosestrife plants out of the wetland. The group then potted the plants in their natural soil and placed them in a makeshift wetland to grow.

Next, the students sewed nets to put over the pots, using a fine mesh material provided by the DNR. Once the plants grew approximately two-feet tall, the DNR sent Peterson 100 Galerucella beetles.

By releasing 10 beetles into each netted plant, the university ended up with roughly one hundred times the original population within six to eight weeks, said Peterson. Some of the adult Galerucella beetles were set loose in the university’s loosestrife infested wetland. The rest were given to the DNR to be used in other state wetlands.

Purple loosestrife, which was once a garden plant native to Europe and Asia, has spread rapidly across the Midwest during the past 20 years. The plant chokes waterways and threatens native plants and wildlife. Since the mid-1990s, the DNR has lead a program to rid the state of this invasive plant.

The center’s online academic skills program also assists students with time management, listening and note taking, reading, stress management, test taking, goal setting and motivation.

A career that fits
Responsibility for all students who remain undecided about their major was also transferred to the Advisement Center, where a proactive approach is being taken to direct the students to a career.

Advisers strongly encourage students who have not declared a major to choose one by the end of their third semester. They will also suggest the student take a one-credit career exploration seminar.

During this quarter-semester class, students learn more about their strengths and career possibilities by taking three career assessments, conducting informational interviews, learning about the majors at UW-Stout and talking with employers about marketable skills. They then meet with the instructor to review what they have learned and receive guidance.

“The most important factor is finding a major that fits. Hopefully, it is here at UW-Stout, but if it isn’t, we will help them find it. For them to stay here for three years and not make any progress would be a tremendous waste of resources,” said Murphy.

Bug control (l to r) Carolyn Joseph, Tiffany Grabow and Kara Duckett work with student grounds keeper Matt Harambasic to pull up and pot purple loosestrife plants in a campus wetland.

“Want freshmen to be informed members of the Stout community.”
Shirley Murphy
Munching on methane

UW-Stout researchers study environmentally friendly bacteria

A UW-Stout research team is studying peat bog bacteria that slow global warming by eating methane, a potent greenhouse gas.

According to Stephen Nold, UW-Stout associate professor of biology, methane producing peat lands cover an enormous portion of the Northern hemisphere, including large areas of Canada and Siberia. In fact, approximately six million acres of Minnesota are covered by these wetlands.

"By reducing the amount of methane released to the atmosphere by peat bogs, these bacteria are one of trillions of different organisms and processes making human life on Earth possible," noted Jess Kane, a research assistant and Master's degree candidate and member of the research team.

The bacteria studied by the team convert methane into carbon dioxide, a greenhouse gas that is much less potent, but still important in global warming. The team hopes that a better understanding of this process may someday lead to the control of methane production.

"We need to know more about these environmentally friendly bacteria," said Nold. "We want them to stick around, and to keep eating. If they disappear, global warming will accelerate.

Supported by a National Science Foundation CAREER grant, Nold's research team is developing new ways to identify the methane-eating bacteria. To do this, they conduct field research in peat bogs in Bena, Minn., and in the Trout Lake Station in Wisconsin's Vilas County. Up to their knees in water and peat, they study the bacteria's habitat and take core samples that they later analyze in the lab.

The team is comparing the core samples taken from the two different sites, which, Nold said, are strikingly different. The peat bog in Minnesota is nutrient poor and contains very few plant species, while the Wisconsin site provides more nutrients and is home to a much larger variety of plants.

"We want to answer some important questions, such as what controls the organism's ability to consume methane? And, what would happen if their environment becomes warmer or more nutrient rich?" said Nold.

Nold involves undergraduates in his research because he feels that the thrill of scientific discovery can change their lives.

Researcher Brooke Miller, an applied science major, said the research opportunity has indeed been a powerful experience, pushing her to rethink her intended career path. "I like being able to do hands-on things like research, instead of just sitting in a classroom," she said. "It is also exciting to try to make a difference in the world."

Researcher Laura Schultz, a former UW-Stout lab technician and a 2001 graduate of UW-Stout's business program, agreed that the peat land research pushed her to expand her abilities, including presenting research at scientific conferences.

Schultz now attends graduate school and aspires to be a project manager for a biotech firm. "This experience has completely changed my outlook on my career. I have a lot more faith in my abilities," she said.

In addition, the team will have the unique opportunity to publish scientific papers about their research. Michele Zwolinski, UW-Stout's first post-doctorate teaching scholar, is supervising the undergraduates' research and works with them to write the professional articles.

The NSF grant that supports the research also helps students like Breheim gain a deeper understanding of their area of study through exposure to real-world problems.

"This job is a big wake up call for the students we hire, because they have to face hard issues. Still, they come here with an interest in helping people, and really grow into the position. They end up giving and caring more than they expected," said Narda Gordillo, The Bridge to Hope's shelter manager.

Breheim said her counseling experience at The Bridge was a great help to her as she completed an internship at Menomonie High School. "Many times we make snap decisions about people we first meet. Now, I stop and think. If my students are not doing their homework, I do not automatically think they are lazy. Now, I wonder what could be going on in their life," she said.

According to Zwolinski, this type of project allows more students to succeed. "Only a few students actually look forward to being part of this research group, but they love the experience," she explained.

For more information about the research team's activities, visit their Web site at http://www.uwstout.edu/biology/nold.