LESSONS ON LEARNING

FACULTY FOCUS: BETHANY STONE

As a graduate student in Sandra Abell’s College Science Teaching course we discussed college students (and professors) as learners. The discussion opened my eyes to the concept of learners. But I didn’t fully comprehend it until 2003 when my first baby was born. While she learned about the world, I learned from her about learners in general.

I teach biology classes to non-science majors, usually large lectures of 400+ students. My students have diverse backgrounds, interests and levels of understanding. Many are terrified of science. That is understandable. Much of what we discuss happens in the inconceivably small realm of the sub-cellular. How can one memorize, much less comprehend, things that cannot be seen? Would my daughter be able to understand that leaves change color in autumn without seeing it?

Learners [toddlers, students AND professors] generally need to experience something in a dynamic way to understand it. But how can instructors help students visualize sub-cellular processes and understand how they interact? The available images often lack a frame of reference to help students understand which level of organization is involved. Therefore, students struggle with the relationships between DNA, genes, and chromosomes. However, these interactions form the foundation for important biological concepts such as reproduction, development, genetics, biotechnology, and evolution. Without clear comprehension of these concepts, students struggle to achieve important...
As a participant in ET@MO's Series on Academic Transformation, I worked with Allison Wiedemeier and Robin Hurst from Biological Sciences, and Pat Friedrichsen from Learning Teaching & Curriculum to design a digital animation to show how concepts relate to each other within the framework of the human body. We created simple cartoon objects in Macromedia Freehand software and used Macromedia Flash software to animate the images. Our animation enters the human body through the lungs, focuses on the tissue lining the lungs, magnifies a cell, examines its nucleus and dissects its chromosomes to reveal the DNA's chemical structure right down to the atom. Our goal was to provide students with an interactive visual representation of the terms and relationships.

Just as my three-year-old didn't appreciate “Goodnight Moon” by reading it once, students didn't learn much by watching the animation once either. So, students analyzed the animation and answered probing questions in a WebCT quiz. This gave them the opportunity to explore the information represented in the animation and assess their understanding of the concepts.

Exam scores on conceptual questions about genes, DNA, and chromosomes have improved. The semester before we developed our animation, only 69% of my students could correctly relate those terms on the post-instructional exam. This semester, using the animation, 88% understood the relationships.

The following are more connections I see in how technology is being used to address common teaching challenges in classrooms across campus:

Learners learn by doing. With the help of ET@MO staff member, Marsha Lyon, Allison Wiedemeier added a project using multimedia to her course curriculum. She had students in a topics course on AIDS create an informational digital video using a video camera and iMovie software. During the creative planning process, students learned the history, biology and societal impacts of HIV infection more effectively than by lecture alone.

Learners need instant feedback – positive and constructive. Carlos Wexler, from the Department of Physics, has researched the benefits of using of Student Response Systems (see The Innovator, Volume 4, Issue 2). Students submit their answer to a question posed by the instructor using handheld remotes. Instant feedback on everyone’s responses is displayed to the class. Outside of the classroom, many professors are using WebCT or Blackboard quiz tools to provide students with that instant feedback.

Learners can stay on task for a maximum of 15 minutes. Fifteen minutes is the maximum time my toddler will sit and color. Apparently, that time doesn’t lengthen as we get older. To keep the learner’s attention Robin Hurst creates a dynamic learning environment with frequent changes in rhythm and topic. Digital animations, videos, news and sound clips offer valuable breaks from lecture and can be conversation stimulators.

I am grateful for what my daughter has taught me about learners. After living through the enlightening first 36 months of her life I am a wiser and (hopefully) better college instructor. Now I appreciate how faculty members across campus are using technology to provide interactive, visual experiences for our students and, in the process, are increasing learning.

Do you think there is a lack of digital tools for your discipline? Yahoo and Google both offer video and sound search engines that are easy to use. Also, try asking your textbook representative for media resources.
LEADING MIZZOU’S COURSE TRANSFORMATION EFFORTS

Now in its fourth year, the Series on Academic Transformation has had a positive effect on the climate of teaching and learning at Mizzou through the use of educational technologies. The year-long series promotes “transformative change” in courses centering on sustainable technologies coupled with pedagogical practices to address one or more of these goals with technology:

• Meeting growing enrollment pressure
• Establishing and improving assessment
• Establishing interdisciplinary teaching collaborations
• Meeting the needs of unique student populations (first-year, under-served, high ability, nontraditional, etc.)

• Advancing the scholarship of using technology to improve teaching and learning
• Designing and implementing pervasive (anytime/anywhere) technologies and pedagogies
• Internationalizing course curriculum

Work for Matthew Livengood, ET@MO’s Instructional Design Coordinator, begins late spring as faculty teams from across campus submit project proposals. Along with other ET@MO staff, he reviews proposals and may speak with the project leaders to clarify their goals before selecting roughly 10 projects.

According to Matthew, “The selection process is tough and quite competitive. For some departments, what is considered transformative can be fairly routine to others. We tend to select projects that will make the broadest impact and constitute a significant improvement to how the course is offered today.”

Each selected Academic Transformation project is assigned to an ET@MO liaison who coordinates training, facilitates communication, as well as coordinates the project stipend disbursements. Matthew Livengood has served as a project liaison since 2004. He also helps to organize group meetings about teaching and learning with technology.

ET@MO Director Andrew White states, “It has proven effective to have a single point-of-contact with whom faculty teams can interact and coordinate all of the various resources ET@MO has to offer.”

Working with such diverse projects and some of the most talented faculty from a cross-section of departments has kept the entire process interesting. As a project liaison, along with ET@MO Associate Director Margaret Gunderson, Matthew connects various project teams with additional ET@MO staff including Danna Vessell, Marla Germann, David Reid, and Gary Godsy for Blackboard and e-Portfolio support; Tanys Nelson and the META Team to facilitate in-office technology training and custom developed Web sites; Guy Wilson and Marsha Lyon who guide the department’s efforts in digital media and emerging technologies; and Kelly Holtkamp who oversees the financial stipends.

There is consensus among the staff that it is rewarding to work with a team of faculty to implement broad-based curricular innovations in their courses—innovations that often directly impact effective learning for hundreds of students.

So where are things heading in the future? Matthew indicates that ET@MO is seeing a lot more projects involving digital media—and faculty are not just doing video lectures. More and more instructors from visual-based, professional, and demonstration-oriented curricula are using digital media to show professionals at work, create libraries of guest speakers and experts, and enrich their course with real-life examples.

As technology evolves, so do the creative ways that instructors find to bring effective teaching and learning to their MU students.  

Pictured from bottom, left to top, right: Margaret Gunderson, Kelly Holtkamp, David Reid, Tanys Nelson, Matthew Livengood, Marla Germann, Guy Wilson, Danna Vessell, Gary Godsy, and Marsha Lyon.
Educational Technologies at Missouri annually recognizes members of the MU community who demonstrate excellence in using technology to improve teaching and learning. Congratulations to the 2006 Excellence in Teaching with Technology award winners.

Jacquelyn Sandone, of the Department of Romance Languages, received the award in the Undergraduate Teaching category. In sections of Spanish 2100 Jacquelyn incorporates Apple iPods into listening and speaking exercises. Students record themselves in speech exercises that can be played back for self-critique, peer-review, or be submitted for instructor feedback. Students also complete assignments based on their comprehension of audio files that include spoken passages of native speakers.

Marian Petrides, of the Department of Pathology and Anatomical Sciences, received the award in the Graduate Teaching category. Marian is the author of an interactive case book software for training in blood bank medicine, and blood transfusion medicine. The software provides rationale for correct answers in an audio format. Marian also created videos that depict all steps of blood type testing, cross-match testing, and pre-transfusion compatibility testing. These videos are available to students in DVD format, or on the Web.

John Estes, of the Department of English, received the award in the Graduate Instructor/Teaching Assistant category. John uses Web journals in each of his three English courses (English 1000, 1530, and 2030) to enhance student interaction and provide an additional medium for writing exercises.

Jeremy Bloss, of the McNair Scholars Program, received the award in the Staff Support category. As a Student Services Advisor, Jeremy provides basic and advanced computer and software instruction to all scholars needing to improve technology skills. His training enables scholars to use technology to enhance their research presentations, and maintain a Web page marking their professional accomplishments.

The Excellence in Teaching with Technology awards are part of the Office of the Provost’s Award Program. Submit your nomination for the 2007 awards at http://provost.missouri.edu/faculty/awards