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Winter 2012 e-CERTI Newsletter

Center for Educational Research and Teaching Innovation

MISSOURI S&T CERTI *Center for Educational Research and Teaching Innovation*

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Hello S&T instructors: Another semester has rushed by at nano speed! Don't forget to take a moment to enjoy what you have accomplished, as well as the accomplishments of some of your colleagues, which are highlighted in this issue. Also check out tips for handling interruptions and increasing class participation in discussion, as well as a feature on Dr. Martin Bohner.

CERTI NEWSLETTER

Center for **E**ducational **R**esearch and **T**eaching **I**nnovation at Missouri S&T

IN THIS ISSUE

Martin Bohner

Spreading a Passion for Learning

When tardy students try to slip into Martin Bohner's classes unobserved, he barely turns around from the chalkboard to call them by name and let them know that he prefers punctuality.

It's the first week of the semester and most students feel that they have the luxury of anonymity, but Bohner startles them by using their first name and asking them to be prompt for the next class.

Over the years, the Missouri S&T mathematics and statistics professor has noted the dramatic effect this has had on students. "That student will never be late again for the rest of the semester -- and nobody else will be either!" he says.

Bohner is not out to embarrass his students. Rather, he is interested in letting them know that he cares about them and their progress in learning, so he makes it a point to memorize all of his students' names very early in the term. He started this practice many years ago when he had upwards of 100 students per section in his Calculus 2 classes. That was before the days of student photos posted on Joe'SS, so he took his own pictures of each student on the first day of class, put names on the back of the photos, and spent hours memorizing them before the next class meeting.

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(View previous issues)

Give Us Your Suggestions!

Is there an instructor you would like to see featured in the CERTI newsletter? What about a teaching technique that you have found to be helpful? Email your ideas to Diane Hagni for consideration for future CERTI newsletter issues.

Nowadays Bohner teaches smaller classes, so he doesn't have to spend as much time learning names, but he has tried to improve on his system by knowing each student's name *before* the semester begins. "They are impressed," Bohner says, with one of his contagious laughs. "Usually if you tell them their name on the first day of class, they will do whatever you want them to the rest of the semester!"

We love your class!

His strategy has been effective. He can point to five faculty excellence awards, eight teaching awards and one research award to his credit in the 14 years he has been in Rolla. The accolades he is most proud of, though, are the Freshman Engineering "We Love Your Class" awards, which he received in both 2006 and 2007.

> *Usually if you tell them their name on the first day of class, they will do whatever you want them to the rest of the semester!*
>
> **--Martin Bohner**

"It means that even if you don't make it easy, it's possible that the freshman engineers like you," he says, smiling.

Showing care for students by spending extra time to learn their names was not a strategy he observed growing up in Germany, where the educational system is vastly different than in the United States. At the state-funded institutions of higher education, students are not required to be at class and only the final exam counts for a grade. "If the students are not good, they get an 'F'; why should the professor care?" was the prevailing attitude of the time, he says.

Although Bohner had attended San Diego State University to earn one of his master's degrees in the early 1990s through an exchange program with the University of Ulm, it was still a rude awakening for him to begin teaching at Missouri S&T in 1998.

"In Germany, you would never see the professor except for the lecture," he says. "Students would have to talk to an assistant. There was not much interaction.

"My first semester was not good," Bohner admits, when he tried to teach the way he had been taught in Germany. "I had very bad evaluations, but I became better and better. Now, if somebody is in danger to get an 'F,' I write them an email to come to my office!"

They can't afford not to care

He enjoys teaching engineers and finds his own enthusiasm is motivating to students. "They cannot afford not to care, because if I care and expend a lot of effort, they must do it also!" he says with another boisterous laugh.

Part of the effort he expends is putting in a three-hour review of his teaching notes prior to every class he teaches. That means for each unique, three-hour class a semester, he puts in nine hours of preparation time per week, even for classes he has taught repeatedly. For example, during a recent semester, Bohner started at 6 a.m. every Monday, Wednesday and Friday going over all of the theorems, proofs and examples for his 9 a.m. class, and then lectured to his students without any notes. "It has to be fresh," he says.

Fortunately, that semester he taught the same class later in the day, so it was not necessary to review again. However, had he taught a different class, he would

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Getting Students to Talk In Class

If you are tired of being greeted with deafening silence when inviting your class to engage in discussion, read on.

Katie Shannon, associate teaching professor of biological sciences at Missouri S&T, traditionally assigns her upper level classes a scholarly research article to read each semester, in the hopes of it leading to a lively discussion.

After offering discussion questions ahead of time, and circling everyone together in the classroom for some scholarly interaction, she says about the only thing "lively" she hears are the crickets.

A combination of difficult technical jargon in the research papers plus the intimidation of speaking in front of the teacher and classmates is enough to silence everyone but the bravest souls.

Instead of giving up on the assignment, which Shannon designed to help strengthen critical thinking skills, she developed a new strategy loosely based on the C.R.E.A.T.E. method of teaching science using primary literature (Hoskins, Stevens & Nehm, 2007). The response from students in

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have spent another three hours reviewing the material, for a total of 18 hours of teaching preparation time. “Then,” he says, “it’s perfect.”

In addition to Calculus, Bohner has taught a variety of differential equations and statistics classes and financial mathematics at S&T.

Tuesdays, Thursdays and weekends are spent on his editorial work (he is editor-in-chief of two and associate editor for 42 international journals) and his research, in which he explores how the theories of differential and difference equations can be correlated into new theorems with applications in a variety of contexts. He has written or co-authored four books on the subject. One of his master’s degrees and his PhD are in economathematics, a field that is more well-known in Germany than the United States and encompasses mathematics, statistics, computer science, economics and operations research.

Bohner typically advises half a dozen graduate students, meeting with them weekly. Each year, two graduate students come as part of an exchange program that he initiated between Missouri S&T and the University of Ulm, the same program that brought him to the United States early in the 1990s.

Admittedly, it’s a rigorous schedule, but Bohner says it helps to be without a cell phone or TV, which can use up valuable discretionary time on “unnecessary things.” He would rather spend his time immersed in teaching and research, or in helping graduate students find their passion -- the way that he has found his.

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Tips on Handling Interruptions

In a perfect world, you could eliminate interruptions – or at least schedule them at a more convenient time. In the real world, interruptions are usually an unwelcome fact of life, especially for busy faculty members trying to maximize their workday.

Susan Murray, Missouri S&T professor of engineering management and systems engineering, recently finished a research project on the effects of interruptions on white collar workers, and she has some tips for her busy colleagues.

“Most people are unaware of the negative effects of interruptions,” she says. “Interruptions hurt us more than we think they do.” They not only decrease performance and efficiency but add to stress and mental loads for the worker.

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piloting the strategy in fall 2012 has been promising.

“I feel like it’s changed the quality of the discussion,” Shannon says. “It’s so much better and everyone is participating.”

In a nutshell, Shannon gives students not only the scholarly article she wants them to read but five homework questions to work through before the class discussion. Students must work individually on the questions, which they will turn in for a grade.

In the homework, students define key terms; identify the hypothesis or research questions being addressed; discover evidence from previous studies that direct the current experiment; identify the model system being used in the experiment; and analyze one table or figure in the study.

Once in class, students assigned to the same figure/table convene into small groups and discuss their findings. Shannon found that even the quieter students are willing to talk in a group of five or six people. Additionally, since she is not able to be at every group at the same time, the teacher “intimidation” factor is reduced.

The small group discussions apparently give students much more

"There really isn't such a thing as multitasking," Murray explains, just "switch tasking." For example, when a faculty member is sending an email and someone comes into her office to ask a question, one task must cease from being processed in the brain in order to start another process. The time it takes for the interrupted person to be reoriented and resume the first task is called the resumption lag, and costs the person in time and efficiency.

A typical U.S. office worker can have as many as 11 interruptions an hour, with the lost time estimated at as much as $588 billion to U.S. business each year. About 80% of interruptions are beyond a person's control and much of the time they are related to technology -- phones, email, instant messaging, Murray says. Other interruptions are simply people who knock on the office door. The remainder consists of internal interruptions, for example, when you are in the middle of a task and remember something important that you need to do.

In order to manage interruptions more productively, Murray recommends that a faculty member track a typical workday to observe a pattern of when interruptions occur. "They will be surprised what they find," she says. With this information in hand, she says, faculty can schedule their day to maximize productivity.

Here are some insights from her research:

- Interruptions are the least harmful when they occur in the early stages of a task.
- Interruptions occurring at the end of a demanding task have the strongest negative effect on someone's performance. Interruptions occurring in the middle of the task also are negative but not as detrimental as at the end.
- Interruptions during demanding tasks have a greater resumption lag than non-demanding tasks, so more time and efficiency are lost when interruptions occur during a high demand task.
- Schedule non-demanding tasks during peak interruption times, such as office hours.
- One way to deal with interruptions is to delay the receipt of information (diverting calls, turning off email/text notices, putting a

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confidence to talk in the larger class, as Shannon has observed greater participation and engagement with the new method.

Shannon's pilot class was small, about 16 students, but she thinks the strategy can be replicated for larger classes, as long as the small groups' size doesn't exceed five or six students.

Shannon sought input from her students with a survey at midterm. She found that they agreed that the homework questions helped them prepare for the class discussion and that it was worth the time taken to complete it. Students also strongly agreed that the small group discussion gave them more confidence for whole class discussions. As a further benefit, some students commented that they felt working through the homework questions helped them analyze scholarly papers they had to read in other classes as well as assist them with skills they needed for undergraduate research projects, such as OURE.

Shannon will offer her insights and more student feedback during a spring 2013 CERTI faculty event Friday, Feb. 1, at noon.

Hoskins, S., Stevens, L., & Nehm, R. (2007) Selective use of the primary literature transforms the classroom into a virtual laboratory. Copyright © 2007 by the Genetics Society of America.

"Do Not Disturb" sign on the door)

- Providing a mental placeholder when interrupted helps the worker get back into the flow of the task more easily. (Make a mark on the paper you are grading, an electronic comment on the computer, or jot a quick note to yourself so you can resume your train of thought.)
- If you can't delay receiving information in your office, go somewhere that it's likely you'll be undisturbed, such as the library, when trying to finish a demanding task.

Not all interruptions are unwelcome, Murray notes. They can even be helpful, such as when you have been staring at the computer screen for more than 20 minutes and need to look away or stretch in order to continue to work efficiently. After 20 minutes, she says, a person's alertness or attentiveness declines, and even a momentary break helps bring back focus to the task.

As long as there are people, there will be interruptions, but Murray believes it is possible to live in the real world and manage interruptions so that they work for and not against you.

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Instructors Garner Awards

Thirty-seven Missouri S&T faculty have been recognized on campus with 2012 faculty excellence awards and 2011-2012 Outstanding Teaching Awards.

Congratulations to the following instructors who won **Faculty Excellence Awards**, which recognizes sustained excellence in all three missions of the university – teaching, research and service:

Elizabeth Cudney, engineering management & systems engineering
Jun Fun, electrical & computer engineering
John McManus, history & political science
Steffan (Thomas) Vojta, physics
Jeffrey Volz, civil, architectural & environmental engineering

Congratulations to the following instructors who won **Outstanding Teaching Awards** (awarded by the Outstanding Teaching Award Committee, which bases its selections on student evaluation:

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Answering the Question: *How Do You Know That Students Are Learning?*

Close to 90 participants attended the 2012 Curators' Teaching Summit this fall as Missouri S&T instructors and staff discovered how to better answer the question "How Do You Know That Your Students Are Learning?"

The three sessions were a mixture of panel discussions, round table discussions and case studies. Curators' Teaching Professors answered questions from the audience in the first session about how they assess student learning.

In the second session, participants discovered how to use Bloom's Taxonomy to target higher or lower level thinking skills in their students as well as what an instructor can do when assessments do not accurately measure learning.

In the third session, the group heard about using Classroom Assessment Techniques (CATs), anonymous and usually ungraded strategies to discover how students are learning at various times throughout the semester.

For PowerPoint presentations and a compilation of discussion notes from the series, go to http://certi.mst.edu/events/curators/

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Akim Adekpedjou, mathematics & statistics
Kwame Awuah-Offei, mining & nuclear engineering
Bonnie Bachman, business & information technology
Jason Baird, mining & nuclear engineering
Petra DeWitt, history & political science
Kristen Marie Donnell Hilgedick, electrical & computer engineering
Stephen Gao, geological sciences & engineering

Lance Haynes, arts, languages & philosophy
Gregory Hilmas, materials science & engineering
Irina Ivliyeva, arts, languages & philosophy
Ronald Kohser, materials science & engineering
Vy Le, mathematics & statistics

John McManus, history & political science
Audra Merfeld-Langston, arts, languages & philosophy
Glenn Morrison, civil, architectural & environmental engineering
Gary Mueller, mining & nuclear engineering
Jana Neiss, Teacher Education Program
Kathryn Northcut, English & technical communication

Hank Pernicka, mechanical & aerospace engineering
Ruwen Qin, engineering management & systems engineering
Kenneth Ragsdell, engineering management & systems engineering
David Richardson, civil, architectural & environmental engineering
J. David Rogers, geological sciences & engineering

V.A. Samaranayake, mathematics & statistics
Jeffrey Schramm, history & political science
John Seiffertt IV, electrical & computer engineering
Jeffrey Smith, materials science & engineering
R. Joe Stanley, electrical and computer engineering
Greg Story, physics

Theresa Swift, electrical & computer engineering
Jeffery Volz, civil, architectural & environmental engineering
David Westenberg, biological sciences
Merilee Krueger Wilsdorf, psychological sciences
Terry Wilson, biological sciences

CONGRATULATIONS!

Cookies, Cocoa and Clickers Discussion Dec. 19

Personal Response Devices (clickers) aren't just for large gateway classes.

Instructors at Missouri S&T are using them to generate discussion, develop critical thinking skills, assist in peer learning, debunk conceptual myths as well as make grading easier and manage classes, both large and small.

Enjoy an informal discussion with veteran clicker users as well as instructors interested in the technology at noon, Wednesday, Dec. 19, at "Cookies, Cocoa and Clickers." The location is 208 Norwood Hall.

RSVP to Diane Hagni by Dec. 18 to reserve your spot.

Thinking About An Educational Research Project?

If you are considering an educational research project in your classes for next year or applying for an educational research mini-grant, CERTI will be sponsoring a series of trainings in spring 2013 called Faculty Learning about Educational Research (FLER). More details coming soon or contact Diane Hagni for more information.

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