

Volume 1, Spring 2001

# mcli Forum

Teaching, Learning, and Technology in the Maricopa Community Colleges

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Ocotillo

Systemic Reform In Science (SyRIS)



In order to foster student success, the **mcli** is dedicated to supporting and advancing teaching and learning by working collaboratively with faculty, administrators, and district-wide groups to provide quality services, programs, and resources.

**mcli**  
maricopa center for  
learning and instruction

*mcli Forum* is a publication of the Maricopa Center for Learning and Instruction (mcli), within the Division of Academic Affairs and Student Development, in the Maricopa Community Colleges. Published bi-annually as a service to faculty, *mcli Forum* presents feature articles and reports on the programs and services of mcli in support of teaching and learning. This new format replaces the *Labyrinth/Forum/Assidere*. Questions regarding this publication or subscription should be addressed to Tina Emmons, (480) 731-8688. The *mcli Forum* can also be found online at [www.mcli.dist.maricopa.edu/forum](http://www.mcli.dist.maricopa.edu/forum).

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On the Cover: Students in Rick Effland’s anthropology class actively engaged in collaborative activities. No wires to be seen.

# Calendar

## April 2001

- 16 Learning Grants proposals accepted through June 14; for more information about Learning Grants, contact Holly McKinzie Beene, MCLI, (480) 731-8293 or Bob Galloway, MCLI, (480) 731-8630, [www.mcli.dist.maricopa.edu/learngrant/](http://www.mcli.dist.maricopa.edu/learngrant/)
- 18 Honors Forum Lecture Series featuring Sandra Steingraber, "Living Downstream: An Ecologist Looks at Cancer and the Environment," PC Bulpitt Auditorium, 7:30 p.m. to 9:00 p.m.
- 20 Lifelong Learning in Maricopa County Dialogue Day, SCC, Turquoise Room, 9:30 a.m. to 1:30 p.m.; for more information contact Rose Pfefferbaum, PC, (602) 285-7587
- 20 MIL Celebration for 1999, 2000, and 2001 Fellows, DIST, Governing Board Room, 4:00 p.m. to 5:00 p.m.
- 27 SyRIS Celebration 2001, GWCC, Saguaro Room, 12:00 p.m. to 3:00 p.m.

## May

- 22-23 Ocotillo Retreat 2001, PVCC and SMCC, 9:00 a.m. to 3:00 p.m.; for more information, contact Doug Sawyer, SCC, (480) 423-6196 or Alan Levine, MCLI, (480) 731-8297; [www.mcli.dist.maricopa.edu/ocotillo](http://www.mcli.dist.maricopa.edu/ocotillo)
- 28 HOLIDAY: Memorial Day

## June

- 3-6 MIL Summer Seminar for 2000 and 2001 Fellows Learning Grants proposals due (proposals accepted from April 16 through June 14)

## July

- 4 HOLIDAY: Independence Day

## August

- 15 Fine Arts Day, Location/Time TBA; for more information contact Bob Galloway, MCLI, (480) 731-8630; [www.mcli.dist.maricopa.edu/arts](http://www.mcli.dist.maricopa.edu/arts)
- 15 Learning Grants proposals accepted through October 15 (depending on available funds)
- 16 SyRIS: "Celebrate Science," Location/Room TBA, 8:00 a.m. to 4:00 p.m.
- 17 SyRIS: Annual Workshop, DIST Room TBA, 8:00 a.m. to 4:00 p.m.
- 18 Semester Begins

## September

- 3 HOLIDAY: Labor Day
- 7 Service Learning Dialogue Day, CGCC, Room/Time TBA; for more information, contact Sharon Fagan, CGCC, (480) 732-7124 or Duane Oakes, MCC, (480) 461-7394; [www.mcli.dist.maricopa.edu/dd](http://www.mcli.dist.maricopa.edu/dd)
- 13 SyRIS: Active Learning Workshop, GWCC, Room 144, 3:30 p.m. to 6:10 p.m.
- 19 Honors Forum Lecture Series featuring Paul Loeb, "Citizenship: The Individual in Community," PC Bulpitt Auditorium, 7:30 p.m. to 9:00 p.m.
- 20 SyRIS: Active Learning Workshop, GWCC, Room 144, 3:30 p.m. to 6:10 p.m.
- 27 SyRIS: Active Learning Workshop, GWCC, Room 144, 3:30 p.m. to 6:10 p.m.
- 28 Student Success Conference, featuring Dr. Gwen Dungey, Executive Director of the National Association of Student Personnel Administration, Orange Tree Resort, 8:00 a.m. to 4:00 p.m.

## October

- 5 Critical Thinking Dialogue Day, Location/Room TBA, 12:00 p.m. to 3:00 p.m.; [www.mcli.dist.maricopa.edu/dd](http://www.mcli.dist.maricopa.edu/dd)
- 11 SyRIS: Active Learning Workshop, GWCC, Room 144, 3:30 p.m. to 6:10 p.m.
- 12-13 MIL: Fall Interim Meeting, Location/Time TBA; for more information contact Maria Chavira, MCC, (480) 461-7037 or Maria Harper-Marinick, MCLI, (480) 731-8294; [www.mcli.dist.maricopa.edu/mil](http://www.mcli.dist.maricopa.edu/mil)
- 15 Learning Grants proposals due (depending on available funds) -- end of FY 2001-2002 cycle
- 17 Honors Forum Lecture Series featuring Terry Goddard, "The Livable Urban Community," PC Bulpitt Auditorium, 7:30 p.m. to 9:00 p.m.

- 20 Learning in Retirement Associations of Arizona (LIRAA) Annual Conference, Washington Adult Center, Phoenix, AZ; for more information contact Rose Pfefferbaum, PC, (602) 285-7587
- 25 SyRIS: Active Learning Workshop, GWCC, Room 144, 3:30 p.m. to 6:10 p.m.

## November

- 2 Technology Dialogue Day, Location/Time TBA; for more information contact Alan Levine, MCLI (480) 731-8297
- 8 SyRIS: Active Learning Workshop, GWCC, Room 144, 3:30 p.m. to 6:10 p.m.
- 12 HOLIDAY: Veteran's Day
- 14 Honors Forum Lecture Series featuring Pat Mora, "Building Community Through Literature and Literacy," PC Bulpitt Auditorium, 7:30 p.m. to 9:00 p.m.
- 14 Jazz Concert, Care Cultural Center, Time TBA; for more information contact Bob Galloway, MCLI (480) 731-8630
- 22-23 HOLIDAY: Thanksgiving
- 29 SyRIS: Active Learning Workshop, GWCC, Room 144, 3:30 p.m. to 6:10 p.m.
- 30 MIL: Nominations due from college Presidents, Deans of Instruction, and Faculty/Staff Development Coordinators

## December

- 3 MIL: Application process begins for potential MIL Fellows
- 10-13 Final Exams
- 14 Commencement
- 15-31 Winter Recess

## January 2002

- 1 HOLIDAY: New Year's Day
- 4 All-Faculty Convocation, PC, Time TBA
- 4 SyRIS Module Presentations, All-Faculty Convocation, PC, Room TBA, 12:00 p.m. to 2:00 p.m.
- 12 Semester Begins
- 21 HOLIDAY: Martin Luther King Jr.'s Birthday

## February

- 8 MIL: Applications due for MIL Fellowship
- 18 HOLIDAY: President's Day
- 20 Honors Forum Lecture Series featuring William Shulz, "Human Rights: The Moral Conscience of the Community," PC Bulpitt Auditorium, 7:30 p.m. to 9:00 p.m.
- 21 Oral Literacy Dialogue Day, SMCC, Room/Time TBA; for more information, contact LynnAnn Wojciechowicz, SMCC, (602) 243-8022; [www.mcli.dist.maricopa.edu/dd](http://www.mcli.dist.maricopa.edu/dd)
- 22-23 MIL: Spring Interim Meeting, Location/Time TBA; for more information contact Maria Chavira, MCC, (480) 461-7037 or Maria Harper-Marinick, MCLI, (480) 731-8294

## March

- 1 Science and Technology Dialogue Day, Location/Room TBA, 12:00 p.m. to 4:00 p.m.
- 11-15 Spring Break
- 20 Honors Forum Lecture Series featuring Chris Eyre, "Developing and Maintaining Community Identity," PC Bulpitt Auditorium, 7:30 p.m. to 9:00 p.m.

## April

- 17 Honors Forum Lecture Series featuring Kimberly Young, "The Future of Community," PC Bulpitt Auditorium, 7:30 p.m. to 9:00 p.m.
- 26 SyRIS Celebration 2002, GWCC Health Auditorium, 12:00 p.m. to 3:00 p.m.

## May

- 6-9 Final Exams
- 10 Commencement
- 14-15 Ocotillo Retreat 2002, Locations/Times TBA; for more information, contact Doug Sawyer, SCC, (480) 423-6196 or Alan Levine, MCLI, (480) 731-8297
- 27 HOLIDAY: Memorial Day

## To Be Announced

- An Assessment Dialogue Day is in planning for Spring 2002; for more information contact Maria Harper-Marinick, MCLI, (480) 731-8294
- Outstanding Performers Music Competition Concert April 2002; for more information contact Bob Galloway, MCLI, (480) 731-8630

# Engaging Students in Problem-Based Learning

MARIA HARPER-MARINICK, PH.D.

**P**roblem-Based Learning, also known as PBL, is commanding increasing attention as an approach to education that promotes students' active engagement in learning and involves them in thinking about their learning. Howard Barrows and Ann Kelson, renowned experts in PBL from Southern Illinois University, School of Medicine, have defined PBL as a total approach to education: there is a PBL process and there is a PBL curriculum. PBL, however, is not equivalent to "problem-centered" or "project-based" methodologies or problem-solving activities, though it includes elements also found in those.

So, what is PBL? Problem-Based Learning involves the use of complex, "real-world" problems as the stimulus and framework for learning. It is based on the premise that students will be motivated to "want to know" and solve the problem posed because it is presented in a context that simulates real world situations. Acquiring knowledge in the context in which it is meant to be used facilitates recall and application of concepts and skills learned (Gijsselaers, 1996). Furthermore, as students engage in solving the problem, they develop critical thinking and problem solving skills while learning content and skills essential to the course.

PBL is not new. This educational approach has been used in medical schools for at least 3 decades. In 1969 McMaster University Faculty of Health Sciences developed a new medical school curriculum using problem-based learning as its foundation. This new approach was to be used throughout the entire 3-year curriculum. By the early 1980s, other medical schools had adopted a curriculum based on PBL, some as a parallel program for a subset of students, others in specific courses or as an entire curriculum. Not until more recently, however, has PBL been embraced by institutions of higher education in areas of education other than health related.

As PBL has been disseminated and adapted to meet specific curricular needs, it has evolved. Many institutions have designed "hybrid" approaches to their curriculum, blending PBL with elements of conventional instructional approaches. However, in spite of the variations in implementation, some elements will always be required to make PBL effective and true to its intent:

**Problem-Based Learning involves the use of complex, "real-world" problems as the stimulus and framework for learning. It is based on the premise that students will be motivated to "want to know" and solve the problem posed because it is presented in a context that simulates real world situations.**

- Learning is student centered. Students are encouraged to become actively engaged in the process and become responsible not only for their own learning, but for the learning of others in the group.

- Learning occurs in collaborative environments. Students work in small groups of 5-10 individuals and build teamwork skills as they try to solve the problem together.

- Teachers act as facilitators, called "tutors." Teachers do not lecture to deliver content, but guide

students in the processes of discovery, inquiry, analysis and reporting.

- Problems are the stimulus for learning and are a vehicle for the development of problem-solving skills. Problems have no single "right" answers; students learn by trying to solve the problem.

According to Southern Illinois University School of Medicine, the aim of PBL is "to produce students who will

- Engage a challenge (problem, complex task, situation) with initiative and enthusiasm.
- Reason effectively, accurately and creatively, from an integrated, flexible and usable knowledge base.
- Employ effective self-directed learning skills to continue learning as a lifetime habit.
- Continuously monitor and assess the adequacy of their knowledge, problem-solving and self-directed learning skills to achieve a desirable outcome given a challenge.



- *Collaborate effectively as a member of a team working to achieve a common goal.*"

### The PBL Process

PBL has been described by Barrows and Tamblyn (cited by Wilkerson and Gijsselaers, 1996) as a process of "hypothetico-deductive" reasoning: students need to acquire data essential to solving the problem, synthesize the data into hypotheses, and then test those hypotheses by collecting additional data. The process can also be thought of as a cycle of analysis-research-report.

In a PBL environment, students are asked to solve a given problem. The problem is posed to the students before relevant information has been presented through any medium, including texts or lectures, about the subject matter underlying the problem.

Students work in small groups of 5-10 to analyze the problem and determine what information they already have and what information they do not know and need to learn in order to solve the problem. First, students brainstorm ideas that could be possible solutions or ideas that could lead to solutions after more information has been gathered. In other words, they propose hypotheses. Then, they list facts based on their prior knowledge and generate questions or "learning issues" about what kind of knowledge or information they need to acquire to explain the fundamental causes of the problem. Each student, or a group of students, selects one or more learning issues to research and develops a plan of action: what to investigate and how to go about investigating it. The learning issues define the focus of the self-directed learning process. New information is acquired through self-directed learning,

when students work together discussing, comparing, and reviewing what they have learned. Students do research on the learning issues using a variety of resources. Students may work in groups or individually, but time is available for independent study.

Students return to the group and report on what new information they have gathered. They review the problem and assess progress in light of the new knowledge. Hypotheses are revised. New learning issues may arise. The cycle is repeated until the problem has been resolved. Once they are finished with a problem, students engage in self and peer assessment of their performance.

The instructor, acting as a tutor, facilitates the process by asking probing questions, monitoring the problem-solving process, and making resources available.

### What is an Effective PBL "Problem"?

A problem is a statement of a real-life scenario designed to challenge learners, promote the acquisition of knowledge, encourage the development of effective problem-solving and critical thinking skills, and require collaboration with peers. Problems need to be relevant to incite students' interest and their desire to solve the problem and to maintain motivation. Typically, scenarios focus on current events; the students' life, field of study, or line of work; classic works within a discipline; application of concepts to everyday life. The most effective problems are complex, open-ended, present a minimal amount of information, and do not have one right solution or require only one way of reaching a solution. These types of problems ensure that students get engaged in the process of analysis, generation of hypotheses, inquiry, evaluation of data, and decision making.

Developing an effective PBL problem is not easy. It requires training in problem development and a considerable amount of time for the design. If you are interested in learning more about PBL and how to develop effective PBL problems, plan to attend:

**PBL IN MARICOPA**  
**APRIL 20, 2001**  
**8:30 A.M. TO 1:30 P.M.**  
**FEATURING ANN KELSON**  
**ESTRELLA MOUNTAIN COMMUNITY COLLEGE**  
**CENTER FOR TEACHING AND LEARNING**

For more information  
on PBL Day, contact:

Rosemary Leary, EMCC, (623) 935-8473  
 rosemary.leary@emccmail.maricopa.edu  
 or Roger Yohe, EMCC, (623) 935-8070  
 roger.yohe@emccmail.maricopa.edu

### References

- Gijsselaers, W.H. "Connecting Problem-Based Practices with Educational Theory." In Wilkerson, L. & Gijsselaers, W.H. (eds.), *Bringing Problem-Based Learning to Higher Education: Theory and Practice*. San Francisco: Jossey-Bass, 1996.
- Wilkerson, L. & Gijsselaers, W.H. (eds.), *Bringing Problem-Based Learning to Higher Education: Theory and Practice*. San Francisco: Jossey-Bass, 1996.
- Problem-Based Learning Initiative (PBLI) at Southern Illinois University School of Medicine: [www.pbli.org](http://www.pbli.org)



For more information on PBL,  
visit the mcli web site at:  
[www.mcli.dist.maricopa.edu/pbl/](http://www.mcli.dist.maricopa.edu/pbl/)

## Teaching and Learning (cont'd)

# Models of Problem-Based Learning in Maricopa

**Rosemary Leary, Ph.D.**  
Estrella Mountain Community College

**M**y introduction to and subsequent adoption/adaptation of PBL was somewhat serendipitous. Last year I was given the opportunity through the Maricopa Institute for Learning (MIL) to work on the development of different types of laboratory experiences for my science students, one that is more "problem" or "question" based and one that is not directed by a laboratory manual or instructor. The MIL Fellowship provided me the time and the means to try this approach in the Fundamentals of Chemistry Laboratory course (CHM 130 LL). It was through reading the literature and in conversations with others that I first learned of PBL and recognized that PBL provided a model that mirrored in many ways what I was trying to do in the chemistry classroom.

In PBL the problem is used to drive the learning. Problems are designed to appeal to the human desire for resolution and harmony and are usually something that the students want to solve or address. From the students' perspective it addresses the question "Why do I need to know this?" "How does it relate to the real world?" The problem must set up the need for and the context of the learning that follows.

This sample problem written for CHM 130 LL Course is a typical PBL problem.

You are currently employed by a major manufacturer of soaps and detergents. The company has spent several years in the development of a new product. This new product is almost ready to go to the market. However, before introducing the product to the public, management has requested one more set of tests. Your team has been asked to do a blind test on the product alongside several major competitors. They want to ensure that the prior data collected are not biased. You will not know which sample is the new product and which samples are other major selling soaps and detergents. Your results will be reported back to



Rosemary Leary, Ph.D., EMCC

management who will then determine if, in fact, the new product has lived up to expectations. In order to ensure that your work is replicable, you are asked to follow recipes and protocols that the company has developed for testing soaps and detergents. These recipes and protocols will be provided to you.

The problem engages students actively and generates conversations concerning individual shopping habits, (i.e. why each person chooses the soap s/he purchases.) It also leads automatically to questions such as "What is the difference between a soap and a detergent?" "What makes a soap or detergent good?" and "How can we test this?"

Based on their conversations, students must decide how they will define "a good soap" in a way that they can both measure and test. They then must develop and implement a procedure, collect some data, determine what those data mean, and then relate their analysis and conclusion back both to their own research question and to the assignment they were given by the soap manufacturer. In the process, students learn about solutions, hard water, dissolved ions, soaps, detergents, titrations, and the use of both pipettes and burettes. They get the opportunity to make up their own solutions, something that is not routine in the typical introductory chemistry laboratory. And maybe more importantly, they learn that all laboratory problems are not resolved in a 3 hour time period.



The initial response of instructors and students to this type of lab experience has been positive. Students felt that they had learned a lot, both in terms of chemistry and in terms of general skills. A few students commented that the group work had provided them with skills that they had already directly applied in the workplace. Instructors noted deeper levels of student thinking and understanding. While the students grappled with the ideas behind the lab, they had to work for real understanding in order to design a procedure that would work and yield some meaningful data. This thinking and understanding was reflected in the level of questions asked, in the variety of procedures developed for each lab, and in the quality of the final written lab reports. In addition, student withdrawal rates and student grades were congruent with those in preceding semesters. While direct comparisons cannot be made, it does appear that there was no negative impact on grades, and it can be said that the format did not “chase” students away.

Why PBL in the chemistry laboratory? As stated by the National Research Council, “Learning science is something students do, not something that is done to them.” PBL provides instructors with a tool to enable students to learn science.

#### **FIPSE Team, Gateway Community College**

In 1998, GateWay Community College (GWCC) received funding from the Fund for the Improvement of Postsecondary Education to restructure its Facilities Systems Technician (FST) Associates Degree Program into a Problem-Based Learning (PBL) format. The goal of the project was to develop and implement a two-year training, cohort scheduled, integrated program in which students used problem-based learning to acquire all technical and general education skills needed for an Associate of Applied Science Degree and for work as FSTs in technology-based industries.

In the GWCC program, students do not take courses but fulfill degree competencies by working in learning teams to solve open-ended problems often encountered in the workplace. The program is designed to foster not only the acquisition of knowledge, but the

development of effective skills for problem-solving, self-directed research and study, and team work.

A total of 11 multi-disciplinary problems have been designed which integrate all of the technical and general education competencies for the FST program. The design template for each problem includes a problem statement, list of products and performances to be evaluated, course competencies to be covered, and learning resources. Manuals for students and tutors have also been developed.

An example of one of the multi-disciplinary problems developed for the program follows:

“THE CORPORATION” must provide a refrigerant system trainer to its local operation and to its Japanese plant. Two trainers, an R22 and an MP39, have been acquired for this purpose. Your team has been asked to restore both trainers to operating condition and recommend, with justification, one for the US and one for Japan. Your team will be presenting this recommendation to the Japanese.

#### **FIPSE Team**

Martha Bergin, Faculty, Sociology/Communication  
 Shahin Berisha, Faculty, Mathematics  
 Jackie Fergusson, Faculty, Science  
 John Holmes, Faculty, Facilities  
 Geri Rasmussen, Faculty, English/Communication/Humanities  
 Elizabeth Skinner, Faculty, Reading/Communication  
 Jim Staples, Faculty, Facilities  
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 Steve Clayden, Faculty, Computer Science  
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 Yvonne Zeka, Director Learning Center  
 Maria Harper-Marinick, MCLI, Internal Evaluator

## Technology

# Unwired. Wired. Wireless.

ALAN LEVINE, MCLI

**W**e at Maricopa are fortunate to be "wired." Since the late 1980's, the District has been vigorously wiring buildings to provide a system-wide network of voice, video, and data- wires that connect offices, libraries, computing centers, and chemistry laboratories, for example, across the entire system.

Now, the instructional technology jargon is changing from "wired" to "wireless." This is a step *forward* to more connectivity, freeing us from the tethers to the wall, simplifying the deployment of computer technology in non-traditional learning spaces, and opening the door to more cooperative learning activities that use the Internet.

This technology allows one transmitting device, or "access point" connected to the net (by one wire, so we are not totally free of them) that allows many computers to share that network connection via radio waves that travel through walls and over hundreds of feet. Small receiving cards in laptop and desktop computers connect



Rick Effland, MCC

them to the Internet without any cords, at reasonably high speeds.

But this is not an article on the nuts and bolts. Instead, it is an article on how people at Maricopa are using wireless networks now. Some of the colleges are looking at this technology as a means to bring the Internet into older facilities where it would be expensive to run cable. For instructors, wireless networking provides a mode conducive to collaborative activities. Most importantly, wireless networking makes technology more transparent to students.

### Buried Cities and Lost Tribes at Mesa Community College

With Rick Effland's ASB 222/223 courses, "Buried Cities and Lost Tribes," he continues his pursuit of the leading edge of technological innovation. Rick teaches in an ordinary looking classroom complete with chairs, tables, and white boards. Lying on the tables are tangerine, blueberry, and graphite colored Apple iBooks; however, nary a wire can be seen.

Students stream in for an 11:00 AM class, sit down, and start their work-- without an opening lecture. On our visit, 35 students are grouped 2 or 3 to a computer. Some jump in right away while others take longer to hit the right button to log into their class web site. It is a noisy atmosphere of conversation and exchange. Not one student avoids participation.

These ASB 222 students are exploring one of Rick's web sites, a virtual visit to Angkor Wat, where they discover and interpret the meaning of the various dimensions of the ancient site. Room sizes, numbers of statues, etc. all have symbolic meaning. Students navigate through images, maps, floor plans, and descriptive text. Like what

often happens in the study of anthropology, they are problem solving with limited information provided up front. They toggle from web sites to their textbook to class notes to calculators. The computer blends in with the other learning materials. As they work, students often shove the computer across the table and show a classmate what they found and where.

Their assignment requires the students to submit a group reflection online to a shared community on Yahoo eGroups. In this environment, nine sections of Rick's courses are one virtual community (228 students), sharing ideas although some are studying the course with a New World focus and others have an Old World focus.

With a wide range of choices in how they present their information, students are often creative. One student inquires, "Is it okay if we do our report as a web site and we just submit the URL?" Rick just smiles at this initiative.

### South Mountain Community College Wireless Brings the Internet to Older Classrooms

At South Mountain, an initiative for wireless networking is driven by a need to bring connectivity to older classroom buildings. Wireless technology here is a cost effective solution to a facilities problem.

Currently, in the Physical Science and Life Science buildings, only one classroom in each is sufficiently wired with electricity and network cables to provide network access. Details provided by Manuel Lopez include newly installed Cisco Aironet 350 access points, one per building, that provides the network capability for a total of 8 classrooms.



Faculty who teach in these buildings can share a fleet of 51 laptops equipped with wireless network adapter cards. And that, Manuel says, is “turning every classroom in these buildings into an Internet-ready learning space.”

### Seamless Learning in Science Courses at Chandler-Gilbert Community College

Biology instructor Pushpa Ramakrishna has led an effort now in its third semester to use wireless laptops in CGCC’s science lab classrooms. It is part of an effort to create “seamless” learning in lab sciences with a mixture of introductory lecture, computer-based inquiry exercises, hands-on wet labs, and follow-up discussion.

The wireless technology at Chandler-Gilbert allows faculty to quickly deploy a fleet of 24 laptops to any of 4 lab classrooms. Then students can explore an online simulation, build their hypotheses, and try them out as they do a hands-on wet-lab exercise.

On the day of our visit, students in BIO 181 were working in pairs to find information about respiration, using Pushpa’s “Wonderful World of Yeast” web site. On this site, they find information presented as content and they can analyze microscopy images using Java simulations to gather data.

While it was hard work to restructure her courses, Pushpa has found that wireless access provides a smoother transition between online learning resources and the activities occurring in



Pushpa Ramakrishna, CGCC, and students

her class. She has trained Biology adjunct faculty to teach in this environment. Other faculty in Chemistry and Physics are using the wireless fleet in their labs as well.

According to Instructional Technologist Tom Foster, wireless technology supports the college’s “emphasis on cooperative learning across the curriculum--it takes away the requirement to go to a computer lab for an online activity... And it is relatively cheap!” At this point the main challenge is developing a system for scheduling the use of mobile computers, and Chandler-Gilbert is addressing this by identifying a faculty liaison responsible for each equipped classroom.

Pushpa had told her students that we would be visiting to observe their use of wireless networking. One of their students commented, “Wireless? I never knew we were using wireless technology.” We cannot do better for making technology transparent.

### How Wireless to Go?

No doubt we will see more use of wireless network technology at Maricopa (also in use now at Rio Salado College and Paradise Valley Community College). It addresses issues of providing flexible technology (using the Internet in the context of a class activity rather than forcing an activity into a computer lab). Bringing the Internet to class becomes much simpler. And we can more fully realize the power of communications technology for collaborative learning activities.

Other institutions are going as far as providing enough transmitters to provide network connectivity from any point on campus. As soon as you enter the grounds, you are wired.

And you can expect even more “wirelessness.” My local dry cleaner showed me his new wireless web cell phone, where he can read email, check online financial information, read news stories, etc. Palm pilots and next generation PDAs will open more doors for connecting net based information.

What happens as computing devices shrink, cheapen, and have fewer wires? Perhaps we become less aware that we are doing something with a technology and more aware of what we are doing with it. Wireless networking is a fantastic tool, but we will always need worthwhile ideas for what we do in this new environment.



# Student Outcomes Assessment in Maricopa

This past February, the District Student Academic Achievement Assessment Committee (DSAAAC) submitted to the Governing Board a report on the progress of assessment efforts in the District. The report addresses the Board's goal for Student Competencies under University Transfer Education and General Education. In addition, the DSAAAC presented the assessment efforts at the February 13th Governing Board meeting, when the Board members were able to review progress with representatives from each college.

The document includes ten separate college reports prepared by the student outcomes assessment committee from each college. The first section of each report is an executive summary of assessment efforts, methods, skills and abilities for academic year 1999-2000. The next section highlights one or two specific outcomes, based on the question: "What have you learned from these efforts, or how have you used the results of assessment to improve teaching and learning?" The last section of each report is a summary of recommendations for future continuous improvement.

All of the colleges reported active engagement in assessment of student competencies and use of results to improve teaching and learning. During the last year, the colleges demonstrated leadership in developing diverse efforts to assess students based upon each college's unique environments, student bodies, faculty, and staff. In addition, DSAAAC and the colleges propose to continue the dialogue about the following issues concerning assessment in future discussions:

- On-going assessment of student learning is a complex process of continual evaluation, analysis, re-evaluation and improvement.
- Development of valid and reliable methods and instruments is arduous and takes time as does collection and analysis of the data.
- Student participation in assessment activities at colleges throughout the District is one of our biggest challenges; new ways to motivate students and



#### MEMBERS OF THE DSAAAC COMMITTEE

From L-R Rear: Ken Roberts (SMCC), Tom Trolen (SCC), Georgia Gudykunst (DIST); Front: Jeanne Canham (CGCC, Chair), Laura Helminski (RSC), and Maria Harper-Marinick (MCLI)

increase participation need to be explored and supported.

- There is increased demand for accountability from internal and external agencies and communities; colleges are trying to reach a balance to meet those demands while striving to improve teaching and learning.
- There is a cost associated with designing and conducting research, development, and implementation of assessment activities, including collection and analysis of data.
- As the District initiates its strategic planning efforts, on-going assessment of student learning should be considered as a planning element.

During the Board meeting, Governing Board members and others in attendance gave feedback about what was presented.

◆Jeanne Canham, CGCC and Maria Harper-Marinick, Ph.D., MCLI

[www.mcli.dist.maricopa.edu/ae/](http://www.mcli.dist.maricopa.edu/ae/)

#### DSAAAC Committee Members

Donna Benson, MCC  
 Jeanne Canham, Chair, CGCC  
 John Frasure, EMCC  
 Jerome Garrison, SMCC  
 Mark Gooding, MCC  
 Andrea Greene, MCC  
 Georgia Gudykunst, DIST  
 Maria Harper-Marinick, MCLI  
 Laura Helminski, RSC  
 Kathleen Iudicello, EMCC

Brent Jameson, PC  
 Sue Kater, GWCC  
 Pat Medeiros, SCC  
 David Raffaele, GCC  
 Gail Snyder, EMCC  
 Ken Roberts, SMCC  
 Tom Trolen, SCC  
 Rick Vaughn, PVCC

# Encouraging Teaching Excellence

HOLLY MCKINZIE BEENE, PH.D., MCLI

Within community colleges, Faculty Development is essentially a two-part challenge: first, to foster instructional excellence and, concurrently, to nurture collegial connections that foster instructional excellence. The good news is Maricopa's faculty developers have long addressed the former and in recent years have paid more attention to the latter.

## Instructional Excellence

Let's face it, the overwhelming majority of us learned to teach on the job, which translated to past lives as students or graduate teaching assistants, or from breathtaking first-year experiences.

We know that Maricopa's hiring committees regularly assess applicants in microteach sessions, just as they evaluate disciplinary expertise. We also know that all our faculty increasingly express interest in learning theory and teaching methodologies.

## WHAT IS MARICOPA DOING?

College faculty development strategies focus on developing instructional expertise toward advancing student learning. For many of us, this translates to concerns for active learning methodologies, new technologies, and adult learning theory--along with equally pressing concern for the rudiments of course and classroom. Nowhere are these needs more punctuated than in the ranks of new faculty and adjunct faculty, which is why you're seeing increased efforts in this direction.

## Collegial Networks

Along with methodological issues are exigencies of teaching itself, brought to light by a growing national awareness of teacher shortages and a mounting body of literature that characterizes teaching as one of the most isolated professions (Hutchings & Shullman, 1999; Kraft, 2000). Even among those of us who delight in strong departmental networks, the dynamics of

our actual day-to-day work essentially occur in isolation. Participation in programs and events that bring faculty together in MCCD to share their teaching experiences seem to promote important colleague affiliations.

## WHAT IS MARICOPA DOING?

Most Maricopa colleges support new faculty with extended programming usually designed as collaborations of college administration, faculty governance, and individual departments. These efforts take various forms, including Rio's Faculty Support Team (FAST) and PVCC's Collegial Support Partnership Program, which provide mentoring to faculty.

In addition to individual college programs, **mcli** supports collaborative efforts such as Dialogue Days, Learning Grants initiatives, and summer opportunities, including Maricopa's upcoming participation in ASU's Summer Teaching Institute ([www.asu.edu/clte](http://www.asu.edu/clte)).

On the horizon is interest in piloting a collaborative online college teaching environment designed to build networks of colleagues through discussion of incidents and concerns common to new faculty. If implemented in the Maricopa District, it would give faculty the opportunity to participate with colleagues at a time and place convenient for them.

## Where Do You Fit?

Your college Faculty Developers invite not only your participation, but also suggestions. If you'd like to know more or be more involved in professional development, just pick up the phone and call your college faculty/staff development coordinator(s).

[www.mcli.dist.maricopa.edu/fsd/](http://www.mcli.dist.maricopa.edu/fsd/)

## References

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- Kraft, Robert G. (2000). Teaching excellence and the inner life of faculty. *Change*, 33(3), 48-52.
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## SOME OF YOUR COLLEGE FACULTY/STAFF DEVELOPMENT COORDINATORS



From L-R Michaëlle Shadburne (PVCC), David Gerkin (PVCC), and Margaret Hogan (MCLI)



From L-R Roger Yohe (EMCC), Holly McKinzie Beene (MCLI), Lara Collins (SMCC), and Ned Miner (PVCC)



From L-R Laura Helminski (RSC), Jennifer Kester (EMCC), Debbie Krumtinger (GCC), Joe Ortiz (SCC), and Judy Boschult (PC)



From L-R Jonelle Moore (MCC), Sharon Fagan (CGCC), Paula Garner (PVCC), and Peter Zawicki (GWCC)

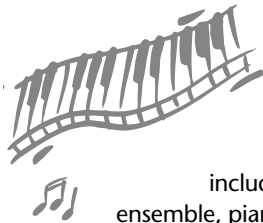


## Celebrating Music, Creative Writing, Dance, and the Visual Arts

Through the **mcli**, Fine Arts Development supports students, faculty, and various programs of the Maricopa Colleges. We are fortunate that all ten colleges are able to offer an art experience at some level. The role of Fine Arts Development is to maximize exposure and opportunity for students to display their talents.

### Music

Currently, the Fine Arts office helps colleges sponsor several district initiatives to celebrate the creative talents of our students. One of the longest running programs is



the Music Competition. Students in vocal and instrumental performance are selected by local music judges to compete for scholarships. The contest culminates in a performance by the first place winners in eight categories including vocal, instrumental, jazz, chamber ensemble, piano, and guitar. This year, Scottsdale Community College hosted the performance. It was a very special event due to the Maricopa Center for Arts and Entertainment Technology's (MIAET's) live broadcast on the Cox digital cable channel 130.

### Creative Writing

In its eleventh year, the Creative Writing Contest featured the finest writing in poetry, short story, one-act plays and creative non-fiction. A panel of judges selected entries, and the winning pieces were featured in an annual *Maricopa Anthology for Creative Writing*. First place winners were then forwarded to the League for Innovation writing contest for inclusion in their National Anthology. The League also sponsors an exhibition catalog featuring the top five visual art works produced by each member district.



### Dance

One of the most recent events is an effort of the dance programs to create a choreography competition. This venue is unique for us in that it is a collaboration

between student performers and choreographers. The student dance companies work with local choreographers drawn from both student and professional categories. The original pieces are then performed in a series of dance concerts.

The Fine Arts office also works with faculty to showcase the talents of their students through special events and performances. To assist colleges with developing and strengthening the visual and performing art programs, faculty are encouraged to apply for Learning Grants (formally known as Vibrant Art Grants).

### Arts Education

In addition, the Fine Arts office works with local art advocacy groups to sustain and promote a vigorous arts educational environment. Our partners in these endeavors include Arizonans for Cultural Development and the Arizona Arts Commission. In cooperation with both these agencies, Maricopa is able to participate in such statewide events as the Arizona Arts Congress and the Governor's Art Awards.

### Fine Arts Day

At the beginning of every academic year, we host Fine Arts Day, a celebration and acknowledgment of the arts in Maricopa. While recent Fine Arts days have dealt with future planning issues, the 2001 Fine Arts Day (Wednesday, August 15th) will feature local visual and performing art organizations such as the Phoenix Art Museum, Arizona Ballet, the Phoenix Symphony, and the the Arizona Theater Company. The day-long conference will focus on beginning or rekindling community partnerships as well as looking for areas of common interest.

The colleges of Maricopa have a rich history of nurturing the wonderful talents of the students we serve. The office of Fine Arts Development and the **mcli** focuses on supporting faculty to be dynamic and effective instructors.

◆Bob Galloway, MCLI

**Web site (under development)**  
[www.mcli.dist.maricopa.edu/arts/](http://www.mcli.dist.maricopa.edu/arts/)

## Honors

# Honors 2001-02: "Community as Text"

### "Community as Text"

On April 6, the Honors faculty of the Maricopa Community Colleges participated in an Honors Institute at Scottsdale Community College. Over 100 faculty attended. The purpose of the Institute was to plan for next year's theme, "Customs, Traditions, Celebrations: The Human Drive for Community." The Institute Keynoter was Dr. Paolo Soleri, noted philosopher and architect, who has devoted his life to research and experimentation in urban planning. His major project, Arcosanti, is a prototype for his concept of "Arcology, architecture coherent with ecology." The title for Dr. Soleri's presentation was "The Lean Alternative: Rethinking Habitat."

### Honors Lecture Series 01-02

In its 20th year, the Honors Forum Lecture Series has been an integral part of the Maricopa District Honors Program from its inception. The annual Honors theme brings coherence to the district program while allowing each college the opportunity to decide how to implement the theme on its campus. The Governing Board has been generous in its support of the Forum speakers which has allowed us to experience a wide variety of presenters ranging from Robert Ballard to Arun Gandhi to Billy Taylor. Interacting with renowned speakers allows Honors students a unique opportunity to be challenged and inspired, perhaps in a life-altering way. The Forum series also acts as a wonderful ambassador for the district to our community as each of the evening Forum presentations are free and open to the public. The Honors Forum series is another example of unique opportunities offered by the Maricopa District.

The six speakers for the year-long study of the Honors Program theme have been confirmed. The Fall 2001 speakers are Mr. Paul Loeb, Mr. Terry Goddard, and Ms. Pat Mora.



Paul Loeb is an investigative reporter and author who has spent two decades researching and writing about citizen responsibility and empowerment -- asking what makes some people choose lives of social commitment, while others abstain. He has written widely praised books, lectured to enthusiastic responses at over 200 colleges and universities, and keynoted numerous conferences.

Born in California in 1952, Loeb attended Stanford University and New York's New School for Social Research where he worked to end the Vietnam war. His book, *Generation at the Crossroads: Apathy and Action on the American Campus*, explores the values and choices of American college students. His latest book, *Soul of a Citizen: Living with Conviction in a Cynical Time*, stresses the benefits of community involvement and social activism.

On September 19th, Mr. Loeb will address the topic of "Citizenship: The Individual in Community."



Former Phoenix Mayor, and practicing attorney, Terry Goddard is the current Arizona State Coordinator and Senior Community Builder for the US Department of Housing and Urban Development. He was elected Mayor of Phoenix in 1983 and was reelected three times. In 1989, Goddard was elected President of the National League of Cities and was named Municipal Leader of the Year by City and County Magazine. In the same year, Phoenix won the All-America City honors for its Futures Forum, citizens bond effort, and Neighborhood Improvement Ordinance. As Mayor of Phoenix, Terry led the citizen-based planning effort for downtown development, growth management, public art, and historic preservation. His vision of a dynamic downtown Phoenix is becoming a reality today.

On October 17th, Mr. Goddard will address the topic of "The Livable Urban Community."



Author of poetry, nonfiction, and children's books, Pat Mora is an advocate for the building of community through literature and literacy. She speaks often at conferences, universities, and schools about creative writing, leadership, and multicultural education.

Pat was the Garrey Carruthers Chair in Honors, Distinguished Visiting Professor at the University of New Mexico, fall, 1999. She received a Poetry Fellowship from the National Endowment for the Arts. Among her other awards are the Pellicer-Frost '99 Bi-national Poetry Award, four Southwest Book Awards and the Premio Aztlan Literature Award.

Her poems have been translated into Spanish, Italian, French, and Bengali. Her most recent work is *Love to Mama: A Celebration of Mothers*, an edited poetry collection. Pat actively supports having April 30th celebrated as Día de los niños / Día de los libros, a celebration of children, books, languages, and cultures.

On November 14, 2001, Pat Mora will address the topic of "Building Community through Literature and Literacy."

◆Betsy Hertzler, Ed.D., MCC and Margaret Hogan, Ed.D., MCLI

**For more information about the District Honors Program, please contact:**

Betsy Hertzler, MCC  
(480) 461-7583

Margaret Hogan, MCLI  
(480) 731-8305

or

Marybeth Mason, MCLI  
(480) 731-8295

## Learning Grants

# Maricopa's Learning Grants: Investing in Our Future

Communication lines at the Maricopa Center for Learning and Instruction (**mcli**) were buzzing this fall with questions about Maricopa's Learning Grants, a new internal grants program that stresses broad faculty access and zeroes in on one common outcome: student learning. It seems like colleagues, anthropologists to zoologists, are anxious to see if they might participate--and the response has been a resounding "Yes!"

Having learned plenty about grants processing during the pilot, the **mcli** faculty are taking pains to be sure that the next grant cycle is characterized by fewer challenges and even more of what worked well. Toward that end, we thought Forum readers might best be served by the opportunity to browse a categorized list of grants funded during the 2000-2001 pilot.

Perhaps you'll see something below that intrigues you in relationship to your own work or a project you'd like to propose. While we can not provide copies of original grant proposals, the listing includes colleges and the principal grant contact.

### Learning Grants at a Glance 2000-2001

#### EXPLORING CONCEPTS, METHODS, & RESOURCES

- Wellness Education Week [Health/PE]/Linda Crider (GCC)
- Teaching Non-Native Speakers in Multicultural Classrooms and Programs/Bonnie Ehmann (GWCC)
- Going Outside the Box: Exploring Creativity and Learning [Interdisciplinary]/Judy Boschult (PC) & Naomi Story (MCC)
- Learning Communities in Teacher Preparation [Interdisciplinary]/Mary Stewart (MCC)
- Cultural Resources of the Internet [Humanities]/Bonnie Loss (GCC)

#### DEVELOPING INSTRUCTIONAL MATERIALS & MODULES

- FLASH Tutorial [Math]/Tom Foley (GCC)
- Rule Time: Salute to Learning or Calculus: In Pursuit of Learning/Scott Adamson (CGCC)
- Earth Science Image Archive.com/Stam Celestian (GCC)
- Human Physiology Technology Instruction/Jean Revie (SMCC)

- Migration of MTR 270 and MTR 103 from NovaNet to Blackboard [Allied Health]/Charlene Almendarez (GWCC)
- Videography and Digital Images of Interventions for the Physical Therapist/Kirsten Berdahl (GWCC)
- Biology Teaching Modules/Bronwen Steel (GCC)

#### LEARNING/PILOTING/DISSEMINATING NEW TECHNOLOGIES AND TEACHING METHODOLOGIES

- Bringing History into the New Century/Pam Petty (CGCC)
- Biotechnology in the Major Course/Pushpa Ramakrishna (CGCC)
- Innovative Writing Program at Chandler Gilbert Community College/Diane Clark (CGCC)
- Improving Multimedia Integration in the Humanities Classroom/Craig Jacobsen (CGCC)
- Learning Resource Area for PBL/Rosemary Leary (EMCC)
- Promoting Problem Solving Skills [Math]/James Vicich (SCC)
- Gas Chromatography-Mass Spectroscopy Addition to Chemistry Laboratory/John Zikopoulos (MCC)
- Project Adjunct Faculty Institute [Developmental Education]/Pearl Williams (EMCC)
- Professional Development Incentive for Adjunct Faculty [Web-CT; Foreign Language]/Jonelle Moore (MCC)
- Toward Expanded Access and Enhanced Learning Environment: Team-Teaching [Teacher Preparation Program]/James Cervantes (MCC)
- PC Power Review: Developmental English On-Line Writing/Judy Haberman (PC)
- Students' Experience in Foundation Mathematics/Alan Jacobs (SCC)

#### PILOTING/PROMOTING NEW PROGRAMS

- Recruiting and Planning for the New Education Program at the Williams Campus/Brenda Larson (CGCC)
- Maricopa Online Librarian [Faculty Team/Multi-campus]/Shelle Witten (PVCC)
- Mathematics Learning Center/Kate Rozsa (MCC)
- Learning Electronics on Computers/Clifford Heide (SMCC)



#### SUBJECT SPECIALISTS/GUEST SPEAKERS

- Storytelling Workshop/Lyn Dutson (MCC)
- Understanding Our Connections to Water in the Southwest [Interdisciplinary]/ Kim Chuppa-Cornell (CGCC)
- Hope Canyon Presentation [Ecology]/ Jay Mitchell (MCC)
- Storytelling is not for Sissies [Multi-campus]/Liz Warren (SMCC)
- Shared Vision: Cooperative Learning in the Two-Year College [Interdisciplinary writing]/Jim Smith (SMCC)

#### PERFORMANCES/SPECIAL EVENTS

- Let the Games Begin [Theatre]/Steve Meredith (SCC)
- Student Performance in Carnegie Hall [Music]/ Ed Hughes (PC)
- Teaching Excellence for Adjuncts in the 21st Century [Adjunct Faculty Spring Conference]/ Warren Mosby (MCC)
- Exploration [Student Conference: Leadership & Mediation]/Margaret Macias (PC)
- Faces of Glendale [Photography; Oral History; NEH continuation]/Dean Terasaki (GCC)  
◆Holly McKinzie Beene and Bob Galloway, MCLI

## Hot Tips

Many of you have asked about strengthening proposals. The following patterns from the pilot experience may be helpful.

Characteristics of projects funded:

- Clearly addressed criteria in the Learning Grant Guidelines.
- Clearly demonstrated relationship to student learning.
- Clearly addressed budget reasoning within context of proposal.

Characteristics of projects not funded:

- Faculty Professional Growth/Travel requests.
- Requests for activity within standard college responsibilities (staffing, assessment).
- Requests for activity outside of Learning Grant criteria or without clear relationship to the criteria.

Characteristics of components not funded:

- Stipends for faculty to attend professional development activities.
- Stipends/Contracts for college employees that seemed beyond scope of project.
- Project activities that crossed fiscal years.

An expanded version of this article, including program history and proposal tips, appears at the Learning Grant web site:

[www.mcli.dist.maricopa.edu/learngrant](http://www.mcli.dist.maricopa.edu/learngrant)

**For more information about Learning Grants, contact Holly McKinzie Beene, (480) 731-8293, or Bob Galloway, (480) 731-8630.**



# Fostering the Scholarship of Teaching and Learning

## Concept

The primary goal of the Maricopa Institute for Learning (MIL) is to enhance the quality of teaching and learning through a process of individual faculty's defining, implementing, evaluating, documenting, and disseminating a project focused on significant issues in student learning in their teaching fields.

## Model

The MIL is modeled after the Pew National Fellowship Program for Carnegie Scholars. It includes the following elements:

## COMMUNITY

- 5-6 faculty, a faculty chair, and a program manager.

## PROJECTS THAT

- investigate how and under what conditions students learn;
- can be tested with students;
- can be documented and made public;
- contribute to the scholarship of teaching and learning in a discipline;
- have implications beyond an individual classroom.

## EVENTS

- Retreat
- Seminars
- Monthly meetings

## RESOURCES

- Release time
- Travel to national conferences
- Book and article allowance
- Reference library
- **mcli** expertise

## Process

Faculty are nominated by their President, Dean of Instruction, and/or Faculty Developer. Nominated Faculty are invited to submit a project proposal. Submitted proposals are evaluated via a blind process by a committee of former MIL Fellows, faculty discipline specialists, and a representative from the deans. The

proposals with the top five aggregate scores are selected. Fellows participate in the Fellowship for a year, beginning with a summer seminar in early June.

## Projects

Fellows' project topics for the first two years of the program illustrate the range and implications for student learning:

- Research on Methods for Increasing Students' Ability to Think Critically
- Reframing Teaching to Meet Teacher and Student Goals in Psychology 101
- Using the Modeling Method to Enhance Student Learning of Physics
- Problem Based Learning in Introductory Chemistry
- Illuminating Integrated Humanities Classes with Historical Storytelling
- Teacher as Researcher: Providing a Seamless Process in Teacher Education
- The Role of Visualization in Understanding Calculus
- A Pedagogical Model for Active Learning: Collaborative Peer Teaching a Course on Diversity
- Using Empirical Evidence To Improve Teaching And Learning On The Internet
- The Influence of Teacher Oral Communication Style on Student Learning

◆ Maria Harper-Marinick, Ph.D., MCLI

## For more information:

[www.mcli.dist.maricopa.edu/mil/](http://www.mcli.dist.maricopa.edu/mil/)



"Viewing teaching as scholarly work is essential. Teachers so often have to carry out their work in isolation from their colleagues. The result is that those who engage in innovative acts of teaching do not have many opportunities to build upon the work of others."

Lee S. Shulman, President, The Carnegie Foundation for the Advancement of Teaching



From L-R (Rear): 1999-2000 Fellows: Barbara Fahey, SCC, English; Marian Gibney, PC, Psychology; Mangala Joshua, MCC, Physics; (Front) Rosemary Leary, EMCC, Chemistry; LynnAnn Wojciechowicz, SMCC, Humanities



From L-R (Standing): 2000-2001 Fellows: Madeleine Chowdhury, MCC, Mathematics; Holly McKinzie Beene, MIL Faculty Chair, MCLI; Maria Chavira, MCC, Psychology; Yvonne Montiel, SMCC, Reading, Education, Spanish; (Sitting) Vanessa Wilson-Ford, MCC, Sociology; Sara Solter, PC, Communication and Theater

## We welcome our 2001-2002 Fellows to MIL

Scott Adamson, CGCC  
Mathematics

Debbie Anderson, EMCC  
Library and Information Science

John Gibson, GCC  
Computer Information Systems

Sian Proctor, SMCC  
Geology

Nancy Siefer, GCC  
English

Elizabeth Skinner, GWCC  
Reading

# A Spring Snapshot of Ocotillo

Since 1987, Ocotillo has served as a faculty-driven catalyst for addressing technology and learning in Maricopa. The current structure of Ocotillo is a coordinating team, led by Chairman, Doug Sawyer (SCC), with representative faculty chairpersons from roundtables at each of the ten colleges, and supported by Alan Levine, **mcli** Instructional Technologist. For 2000-2001, Ocotillo continues to pursue their goals for increasing the use of technology to enhance learning.

## Goals

Ocotillo focused on three goals for this academic year. We:

- continued to showcase instructional technology, to reach a wider audience within Maricopa, and promote technology in ways that lead to improved teaching and learning.
- worked to prepare the district to maximize technology resources.
- enhanced and provided support for district strategic planning.

## Progress

### GOAL I: SHOWCASE AND PROMOTE TECHNOLOGY

The Ocotillo chairs participated in the planning stages of the March 2 Dialogue Day, "Teaching and Learning in the Digital Age: Something for Everyone." This event featured 20 faculty presenters, who demonstrated and facilitated hands-on training of various technology applications in the classroom. The presentations took place during two 75-minute sessions and allowed participants to choose the topic and level (beginner, intermediate, advanced) appropriate for their technological skills. There was truly something for everyone at this event.

The Ocotillo chairs decided to use some of our valuable meeting time observing technology demonstrations. Each of our monthly meetings now includes a

demonstration of an instructional technology application. This has been very interesting and informative. So far we have seen presentations about MCTV, IntraKal, "My MCC" portal, E-Commerce, and other current activities relating to technology.

Ocotillo will again organize and facilitate our annual "Ocotillo Retreat," to be held May 22-23, 2001. The retreat will take place at Paradise Valley Community College on May 22, and at South Mountain Community College on May 23. The retreat will be an opportunity for participants to focus on particular aspects of instructional technology, and to share successes, challenges, and suggestions for improvement.

### GOAL II: PREPARE THE SYSTEM TO MAXIMIZE RESOURCES

Ocotillo plans to provide forums for faculty and administrators to share with each other the successful cost-effective models for technology expenditures.

Some of the individual college Ocotillo groups have begun collecting data about capital expenditures. These data serve as a follow-up to the capital allocation processes at our colleges. The data clarify whether or not the allocated money was spent on the originally requested item, how many faculty use the item, how many students are affected, and whether the item is adequate for its intended use. These data will also be very valuable as decisions about future spending are made and as capital dollars become more scarce in our immediate future.

### GOAL III: SUPPORT AND ENHANCE DISTRICT STRATEGIC PLANNING

The Ocotillo Chair sits on the district's Strategic Planning Committee and the Technology Leadership Council. Ocotillo participants have much to contribute to our district's visions and plans for the future and I always welcome input regarding issues that should be brought to the Strategic Planning Committee.

The Ocotillo Chairs have spent about 18 months developing a survey which was mailed in March 2001. This survey was sent to about 5000 students who have recently left the community college system. The survey focused on their experiences with technology while at their community college, their technology use in their current situation, and what aspects of technology exposure and/or technology use in instruction were the most valuable. The data from this survey will be very important and will help us justify (or re-examine) the flow of money as larger and larger portions of our budget are allocated to technology.

## Summary

Ocotillo is a flurry of activity. As technology changes the way we think about teaching, learning, record keeping, resources, capital, budget, purchasing, and gathering information, Ocotillo will continually address new issues and challenges. We gladly accept your input at any time.

◆ Doug Sawyer, Ph.D., SCC

[www.mcli.dist.maricopa.edu/ocotillo/](http://www.mcli.dist.maricopa.edu/ocotillo/)



### MEMBERS OF THE OCOTILLO COMMITTEE

From L-R: Roger Yohe (EMCC), Jon Storslee (PVCC), Alan Levine (MCLI), Tracy Price (MCLI), Doug Sawyer (SCC, Chair), and Ken Roberts (SMCC)

## Systemic Reform In Science

# Interdisciplinary Activities and Active Learning in Science

*A Project to Revitalize and Improve the Quality of Undergraduate Science Teaching and Enhance Student Learning*

At most colleges and universities, the didactic teaching approach remains a fixture in introductory science classes despite numerous studies showing students retain little of the information taught. In addition, the approach neither fosters an interest in science nor promotes the critical thinking skills science demands.

In 1997, a science, mathematics, engineering, and technology (SMET) committee organized by then Vice Chancellor Alfredo G. de los Santos Jr. concluded that the diverse learning styles of today's SMET students result in their having difficulty transferring knowledge from one course or solution to another. The committee proposed writing a National Science Foundation (NSF) grant proposal that focused on reforming science teaching and learning by making introductory science courses more interdisciplinary through the use of active learning strategies in the science classroom. In March 2000, the proposal entitled **Systemic Reform in Science (SyRIS)–Phase I** was funded.

### Systemic Reform In Science

SyRIS is a two-year, district-wide project designed to begin the process of improving student outcomes in science through changes in curriculum and pedagogy that align with national systemic reform initiatives. With NSF grant funds and in-kind support from participating colleges and the District Office, a substantial number of science and math faculty are involved in putting together interdisciplinary activities and mastering new active learning strategies that link science courses through real-life applications.

### The Project Goal

The major goal of the project is the design, development, and field-testing of 20 interdisciplinary science modules founded on current curriculum content in 100-level science courses. In addition, SyRIS and other science and math faculty participate in workshops and seminars that provide them with the tools to advance their teaching and ultimately assure student success.

### Faculty Involvement

Each college has identified a science or math faculty member to serve as peer mentor and 2-4 interdisciplinary SMET faculty to serve as a collaborative learning team. The peer mentor and team at each college are responsible for designing, developing, and field-testing their interdisciplinary science module at their college.

Coordination of the project and implementation of the modules is the responsibility of the management team whose members include the principal investigator/program director Jeffrey Pommerville (GCC) and co-PIs: John Mildrew (SMCC), Joseph Pearson (MCC), Pushpa Ramakrishna (CGCC), and Stephen Williams (GCC). The internal and external evaluators are, respectively, Maria Harper-Marinick, Instructional Designer (MCLI), and Howard Sullivan, Professor of Education (ASU).

### Program Plan

In Fall 2000, eight collaborative learning teams each designed and developed an interdisciplinary science module. These modules are being field-tested now at the teams' colleges. Along with these activities, active learning workshops for science faculty were conducted.

In the second year, first-year modules will be implemented in classrooms across the colleges. In addition, the first year collaborative teams will prepare a second cadre of teams who will develop additional modules for field-testing. Again, science education workshops related to active learning strategies for successful teaching and learning will be scheduled.

We believe our efforts to reform instruction will translate into a better, more applied curriculum that will foster a keener interest in science and promote the thinking skills that science and the business community require.

◆ Jeffrey Pommerville, Ph.D., MCLI

[www.mcli.dist.maricopa.edu/syris/](http://www.mcli.dist.maricopa.edu/syris/)



### SyRIS PRINCIPLE INVESTIGATORS

From L-R: John Mildrew (SMCC), Pushpa Ramakrishna (CGCC), Jeffrey Pommerville (MCLI), Maria Harper-Marinick (MCLI), and Joseph Pearson (MCC); Absent: Steve Williams (GCC)

## 2000-01 SyRIS Interdisciplinary Modules

**Catch the Waves**, CGCC -- Pushpa Ramakrishna (Biology), Peer Mentor; Scott Adamson (Mathematics) and Tom Foster (Instructional Technology). A module developed with concepts related to sound, water, and light waves. Students use the blackboard technology asynchronously to explore the interdisciplinary nature of waves.

**Cells As Digital Images--An Investigation**, EMCC -- Natalie Rivera (Mathematics), Peer Mentor; Rey Rivera (Mathematics) and Sandy Zetlan (Biology). A module created for the collaboration between biology and mathematics students as they investigate a biological research question. Student research teams use biological, mathematical, and research methods to identify types of blood diseases and make predictions and verify hypotheses using qualitative and quantitative approaches.

**Energy and Thermodynamics**, GCC -- Karen Conzelman (Biology), Peer Mentor; Cheryl Dellai (Physics), Lisa Diebolt (Chemistry), and Bronwen Steele (Biology). A hands-on module designed to enable physics, chemistry, and biology students to construct the fundamental concepts of thermodynamics from concrete experiences.

**Don't Drink the Water**, GWCC -- Reece Weide (Biology), Peer Mentor; Ernest Chavez (Mathematics), Jim Crimando (Biology), and Lisa Young (Water Technology). Students explore water quality issues using problem-based learning. Elements of chemistry, biology, hydrology, math and communication skills are embedded within the course constructs, providing a real-world connection between concept and application.

**The Problem with Pesticides**, MCC -- James Giles (Chemistry), Peer Mentor; A.J. Lombard (Geology), Cindy Odgers (Technology), and Terry Ponder (Biology). A module designed to conduct activities dealing with pollution, chemicals in the environment, and pesticide use.

**Global Warming**, PVCC -- David Harbster (Biology), Peer Mentor; Casey Durandet (Physics), Vanessa Montgomery (Biology), Stephen Nicoloff (Mathematics), and Shelle Witten (Library and Media Services). A module that incorporates personal energy and resource use audits to ascertain students' general impact upon the environment. Working in teams, they analyze individual and group data to develop a broader perspective of the possible anthropogenic effects of climate change.

**UV Radiation and Effects of Sunblocks**, SCC -- Suzanne Kelly (Biology), Peer Mentor; Patricia Ashby (Biology), Steve Borick (Chemistry), Paul Haugen (Physics), and Keith Worth (Mathematics). This module presents central concepts of radiation: its origins, characteristics, and interaction with the earth's atmosphere and living organisms. It also includes information on the electromagnetic spectrum, the inverse square law and DNA mutations and cancer formation in living cells, the chemistry of ozone and chemical sunscreens, and modeling of data sets.

**Water Pollution and Treatment**, SMCC -- Ann Scarbrough (Chemistry), Peer Mentor; Terry Fender (Mathematics and Physics) and Sian Proctor (Geology). A module incorporating geological, physical, and chemical concepts in the evaluation of water purity and water treatment.

## Resources



### Faculty Development Resources

- DeZure, Deborah, ed. (2001). *Learning from Change: Landmarks in Teaching and Learning in Higher Education from Change Magazine 1969-1999*. Sterling, VA: Stylus. Now available to borrow from **mcli** and soon at all colleges.
  - External Professional Development Opportunities. Description and links to external grants and fellowship programs: [www.mcli.dist.maricopa.edu/fsd/fig/external\\_dev.html](http://www.mcli.dist.maricopa.edu/fsd/fig/external_dev.html)
  - National Teaching and Learning Forum online. Access to electronic version of this excellent teaching resource provided by **mcli** (beginning October 2000) at: [www.ntlf.com/restricted/](http://www.ntlf.com/restricted/)
- \*MCCCD employees can access Volume 9 Number 6 and succeeding issues\*

### PBL Resources

- Banta, T.W., Black, K.E., & Kline, K.A. (2001, January-February). Assessing the effectiveness of problem-based learning. *Assessment Update*, 13 (1), pp. 3.
- Boud, D & Feletti, G. (eds.). (1997). *The challenge of Problem-based Learning*. 2nd Edition. Sterling, VA: Kogan Page.
- Delisle, R. (1997). *How to use problem-based learning in the classroom*. Alexandria, VA: ASCD.

- Duch, B., Groh, S. & Allen, D. (eds.). *The Power of Problem-based Learning*. Sterling VA: Stylus.
- Schwartz, P., Mennin, S., & Webb, G. (eds.). (2001). *Problem-based Learning: Case Studies, Experience and Practice*. Sterling, VA: Stylus.
- Wilkerson, L. & Gijsselaers, W.H. (eds.). (1996). *Bringing Problem-Based Learning to Higher Education: Theory and Practice*. San Francisco: Jossey-Bass.
- Rhem, J. (ed.). (1998). Problem-based Learning: An Introduction. *National Teaching and Learning Forum* 8(1).
- Problem-Based Learning Initiative (PBLI) at Southern Illinois University School of Medicine: [www.pbli.org](http://www.pbli.org)
- Center for Problem-Based Learning Research and Communications: [www.samford.edu/pbl/](http://www.samford.edu/pbl/)
- McMaster University, Faculty of Health Sciences--Programme For Faculty Development: [www-fhs.mcmaster.ca/facdev](http://www-fhs.mcmaster.ca/facdev)
- Planning and Conducting Problem-based Learning: [www.hsc.colorado.edu/CIS/PBLChkList.html](http://www.hsc.colorado.edu/CIS/PBLChkList.html)
- Problem-based Learning At The University of Delaware: [www.udel.edu/pbl/](http://www.udel.edu/pbl/)

### SyRIS Resources

- Deeds, D. G., Allen, C. S., Callen, B. W., and Wood, M. D. (2000). A new paradigm in integrated math and science courses. *Journal of College Science Teaching* 30(3), 178-183.
- National Research Council. (1999). *Transforming undergraduate education in science, mathematics, engineering, and technology*. Washington, D.C.: National Academy Press.
- Wyckoff, S. (2000). Changing the culture of undergraduate science teaching. *Journal of College Science Teaching* 30(5), 306-312.

### Technology Resources

- Bowers, Paul. (2000). Discovery-Based Learning: Lessons in Wireless Technology. *Syllabus* 14 (4): 38-39, 47.
- WirelessWeek: [www.wirelessweek.com](http://www.wirelessweek.com)
- eBYou (wireless laptop program at Buena Vista University): [ebvyou.bvu.edu](http://ebvyou.bvu.edu)

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