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Malcolm Price Laboratory School

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**Integrating Math and Science Curriculum**

*by Karen Couch*

It was a little over one year ago when Karen Couch and James Maltas began utilizing each other's expertise to complement what they were doing in their own classroom. Karen Couch (physics instructor) realized that many of the concepts and techniques used in advanced math/pre-calculus could enhance her physics students' ability to analyze the data collected for an investigation, strengthen their problem-solving capabilities, and increase conceptual understanding. At the same time, James Maltas (mathematics instructor) was looking to focus the advanced mathematics on applications which would help motivate the learning of mathematics concepts—an obvious source of applications, for this mathematics was physics.

This collaborative work eventually led to discussions of an integrated course in Physics and Advanced Mathematics. They soon realized that a course of this nature was not only possible, but that it would benefit students in ways they hadn't counted on, and help prepare them for college courses.

It is now the middle of the 1993-94 academic year, and Couch and Maltas find themselves in the middle of developing and team teaching a fully integrated, year-long course in high school physics/pre-calculus. The curriculum materials and instructional/assessment models that are being developed address the concerns, goals and benchmarks that are being advocated by the American Association for the Advancement of Science, National Science Teachers Association, and the National Council of Teachers of Mathematics.

Couch and Maltas are creating a new instructional learning model, as well as providing...
leadership in the reform of curriculum, instruction and assessment. This project will provide not only the necessary leadership, but will offer teachers throughout the state of Iowa an opportunity to collaborate on a curriculum reform project that may very well shape the teaching of physics and pre-calculus throughout the nation.

For more information, contact Karen Couch at (319) 273-6467 or Jim Maltas at (319) 273-2066 at MPLS, UNI, Cedar Falls, IA 50613.

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**Reaching Out: Making Teacher Education Connections**

*by Terri McDonald*

As early as 1904, John Dewey described the need for observation in the preparation of teachers. He noted the importance of preservice teachers observing master teachers in the natural classroom environment. Because observation is a critical component of teacher education, many institutions of higher education struggle to provide valuable opportunities for students.

Malcolm Price Laboratory School (MPLS) is meeting this demand by providing observation opportunities through the use of fiber optic technology. The project provides live observations of MPLS classrooms via television broadcasts to several locations on UNI’s campus. A mobile television production unit, which can be moved to any MPLS classroom to originate a transmission, allows UNI students to observe an MPLS lesson and participate in a debriefing session with the MPLS teacher. The teacher education program has been modified to infuse these observation opportunities into the curriculum.

Students and faculty, alike, have responded very positively to the live broadcasts. Informal written and verbal responses from observers have been used to modify the system to better fit the needs of the teacher education program.

During the process of carrying out the project, several advantages have emerged. The most obvious advantage allows UNI students to observe the same lesson as their professor, thus providing common ground for discussion. A second advantage of the fiber optic system is providing the opportunity for interaction. Because of time constraints and scheduling conflicts, UNI students rarely get a chance to talk with elementary and secondary classroom teachers when they visit schools for observation.

Another advantage of live transmission is greater focus. By placing microphones and cameras in strategic locations, observation by television has proven to be more effective in certain situations than direct observation. For example, when an MPLS teacher is using cooperative learning groups, it is impossible for observers in the back of the room to hear the process going on in each individual group. The mobile production unit, however, can zoom in on individual groups and capture voices that allow television observers to follow group dynamics and interpersonal activity in each group. Research is now being conducted to pinpoint whether significant differences exist between direct and indirect observation techniques.

The fiber optics project has also provided MPLS faculty with the opportunity to become acquainted with basic television production techniques. Many have become involved in producing model teaching videos and presenting information about the project at local and state conferences. Each lesson is videotaped and stored in the school video collection for later use, provided media release documentation has been received from participants. Eventually, the videotape footage can be pressed onto laser discs for national dissemination.

MPLS is in the process of being connected to the Iowa Communication Network, a two-way interactive television/computer network linking regents institutions, community colleges and other schools in the state of Iowa. This connection, along with UNI’s mobile satellite uplink, will provide even more transmission opportunities for MPLS faculty. Access to satellite technology will make it possible to communicate with most school locations around the world and permit shared services, personnel, materials, and other resources.

UNI’s students, inservice teachers, preservice teachers and university faculty members are just beginning to explore the potential of collaborative activity using electronic communication systems. The fiber optics project participants have discovered the potential of using these technologies for enhancing learning is limited only by their imaginations.

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