

A Classroom Evolved

Students Advance Because of Technology and Real-World Application

By Missy Raterman

Diablo Valley College is one of three publicly supported two-year community colleges in the Contra Costa Community College District in California. DVC serves more than 22,000 students of all ages through more than 2,600 courses offered in 57 occupational specialties.

Many students at the college come from underrepresented socioeconomic groups. Thanks to a grant package that provided wireless technology, cash, and professional development, new learning experiences ignited student interest in the subject matter and helped them get a better focus for their studies.

Calculated Improvement

When Diablo Valley College Calculus II professor Despina Prapavessi was asked whether students entered her course with a strong background in the type of mathematics that they would be expected to engage in during the semester, she replied, "This particular class happened to have a rather weak background in many of the fundamentals they would need to build on for the purpose of the course, but once technology was incorporated in the classroom, participation and learning improved close to 20 percent."

As a recipient of a 2005 Hewlett-Packard Technology for Teaching Higher Learning grant award package, Prapavessi was able to redesign her curriculum with a focus on technology. This gave way to immediate results. Once technology was incorporated into the classroom, 17 percent of Prapavessi's students improved their scores by one to two letter grades during the 18-week semester. This course also reported a 98 percent attendance rate and Prapavessi saw a level of camaraderie between the students that she had never before experienced in her 16 years of teaching at DVC. Along with improving their ability to collaborate on projects in the classroom, students also strengthened their independent, critical thinking skills. These positive additions to the classroom environment resulted in a spike in the number of students with an overall score of 83 percent or higher.

During her course redesign, Prapavessi had a two-fold philosophy of teaching that guided her course development. She felt it was important that the curriculum supported:

- Inquiry-based learning: A method that encourages students to question why they want to learn the subject at hand and creates the need for the learning to be relevant beyond the objective of classroom testing.
- Cooperative-based learning: A method that stresses the importance of the social experience of classroom learning and supports the building of strong relationships between teacher and student, student and student, and student and curriculum.

To achieve this type of environment, Prapavessi felt that it was important to create memorable and active learning experiences, "It's important that students own their learning," she said.

Make it Fun

The award package Prapavessi received included, along with other amenities, 20 tablet PCs which were shared with two other classrooms in a rotation cycle. Personal familiarity with tablet PCs allowed Prapavessi to maximize the impact of having the technology in her classroom. Prapavessi experienced several positive results, which included:

- Flexibility: Students could walk around the room taking notes and collecting data or work as a group in areas outside the classroom.
- Ability to give feedback in real-time: The tablets, along with the software programs used in the course of the semester, allowed for instant submission and feedback of work during in-class problem solving exercises. Prapavessi was also able to garner anonymous submissions from students by way of the tablet PCs and then cast the submissions on the projector screen, using a software program to work through the students' misconceptions as a group.
- Confidence: The new method of communication seemed to lighten the mood in the classroom so that students felt more comfortable making mistakes, which in turn made them more open to learning. The anonymity that the tablet PC submission process was able to provide in terms of feedback cycles also led to instances of many students "tagging" their submissions and including jokes to share on the projector, providing students with a way to laugh together while learning.

Keep it Relevant

Along with the inclusion of new technology in the classroom, Prapavessi's redesigned curriculum incorporated fieldtrips that allowed students to see how calculus is relevant in the real world. These trips included a visit to the Pacific Southwest Forest Service Station where students saw how mathematics can be used to study hawk migration and elk movements. A trip to Roche Pharmaceuticals prompted positive reactions from students. One student said, "The field trip was like the word problems we learned in class but more complex. So now we know that the math formulas we are learning are actually used in real life." The technology alone did not enhance the learning that occurred in the classroom. Rather, it was a combination of real-world applications and relevant teach-friendly technology that worked together to make learning accessible and pertinent to the students.

In the words of Jim Vanides, program manager of the Worldwide Higher Education Grants in the HP Corporate Philanthropy department, "If you take technology and throw it into a classroom where a professor is really focused on teaching the way they've always taught with no plan to really change the learning environment, you risk having the wrong things happen. It's the combination of exemplary teaching plus the power of the technology where the magic happens."

More Than Just the Hardware

HP's educational philanthropic philosophy initiatives focus on three major areas:

- Transforming the learning experience: Integrating technology into classrooms to revolutionize teaching and learning processes.
- Leading students to high-tech careers: Increasing the number of students on paths toward high-tech careers, emphasizing groups that are underrepresented in the technology sector.
- Student success in math, science and engineering: Enhancing skills in math, science and engineering through national and district-wide school reform and teacher professional development.

When the U.S. HP Technology for Teaching Grant Initiative was launched in 2004, the grant supported projects in more than 400 schools. The original vision had been to commit \$25 million over the course of what was intended to be a three-year program. However, HP will be funding its fourth year of grant recipients and has provided more than \$36 million since 2004, impacting 589 K-12 public schools and 155 two- and four-year colleges and universities engaged in transforming teaching and learning through the integration of technology in the classroom and beyond. "The philosophy really is: plant a bunch of seeds, see which ones grow and then help those projects who are having the most success really blossom," says Vanides. During the past 20 years, HP has contributed more than \$1 billion in cash and equipment to schools, universities, community organizations and other nonprofit organizations worldwide. However, HP strives to provide more than just the hardware for the educators and communities it supports, as Vanides notes, "If you just give away hardware, you might as well forget it."

Forging On

The learning for educators doesn't stop once the funding runs dry. Vanides is involved in several continuation projects that focus on the development of grant recipients and non-recipients. He is also committed to connecting educators with educators. "This is not about 'Here's some technology, have fun and good luck,'" Vanides says. "It's really, first and foremost about helping students learn better and giving professors a chance to redesign their course, and the technology is supposed to support all that. The projects are more about teaching than they are about technology, and what's interesting is that the technology allows teachers to do some things that they were never able to do before ... it creates a whole new social environment," says Vanides. Prapavessi remarked on this in her classroom, too: "It's refreshing to be able to have the freedom to explore new methods of teaching. For me, it makes the learning feel less fragmented."

The continuity and connectedness of the grant initiative is evident from the funding to the classroom and beyond. The process starts with visionaries like Vanides who strive to connect educators with global learning tools; the process is supported by the grant initiative which requires measurable outcomes; the process is enacted by leaders like Prapavessi who support students through innovative redesign and willingness to learn alongside them; and the process is further fueled by classroom software tools. With the right perspective, there are really no limits to what technology can inspire.

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