The U.S. Air Force Academy in Colorado Springs, Colo., uses tablet PCs to power cutting-edge student-teacher interaction.

MATH AND MIND READING

Agency: U.S. Air Force Academy

Mission: Educate, train and inspire men and women to become officers motivated to lead the United States Air Force in service to the nation.

Technology Objective: Find a durable, high-performance tablet PC for Air Force cadets to use throughout their four years at the Air Force Academy and empower new electronically interactive classroom technology.

Solution: The Air Force Academy selected Gateway tablet PCs for cadets to use for all educational needs.

ROI: Instructors have new and better ways to interact with and teach students, increasing student engagement and improving teachers' ability to identify and help struggling students.

The **U.S. Air Force Academy** in Colorado Springs, Colo., took a radical step in 1985, equipping all incoming cadets with mobile computers.

Lt. Col. Lem Myers, a math teacher at the academy, is constantly on the lookout for new teaching methods and technologies that better help students learn. A few years ago, he found one.

Myers and a like-minded officer joined forces to lobby decision-makers at the academy to switch incoming cadets' computers from laptops to tablet PCs, which enabled an interactive technology Myers knew could revolutionize student-teacher interaction in the classroom.

The procurement committee agreed, and after a rigorous selection process, purchased more than 1,200 Gateway tablets.

Mind Readers

Myers knows that in any classroom, there are more students who need help than ask for it. The tablets empowered him to find those students.

Cadets handwrite math problems on wireless tablets in the classroom. Myers implemented software that lets him see each cadet's progress in real time on his own computer monitor. One classroom so far is set up this way as an experiment for the current academic year. Myers said he plans to expand the program to more classrooms next year.

"The instructor can zoom in, take control of the student's tablet — maybe circle something the student is doing incorrectly — and then move on to the next student," Myers said.

He said the tablets and software bring him as close to reading struggling students' minds as possible.

"Instructors can see at a glance who looks like they're struggling," Myers said.

The tablets not only enable student-teacher interaction, he said, but also interaction among students. "We really like this idea of the shared working space where the students try to work through problems, digitally communicate their ideas to each other and the instructor. Then at the end of the lesson, they've got everything that was exchanged down on the tablet. One bad thing about them going to the board is they don't take the board with them when they leave the classroom," Myers said. "You can see the potential as far as bringing all the students into the process. Maybe the students who weren't as engaged before now will be engaged and actually learning."

The academy recently did a study comparing classes that used the tablet to those that didn't.

"We found that the engagement level of students went up by about 10 percent for the section of students using tablets, versus the control sections where they only had normal laptops," Myers said.

Cadets choose whether to participate in the electronically interactive classroom.

"They tend to be the types of students who are more adventurous and willing to take part in these kinds of experiments," Myers said, adding that many cadets say they feel more connected with their instructor and fellow students in the classroom.

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> — *Lt. Col. Lem Myers*

Myers and another math instructor are currently the only two instructors using the new interactive technology in the classroom, but he said other departments at the academy, like biology and English, are considering ways to use the tablets for interactive classrooms of their own.

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He said the ability to handwrite math problems on the tablet makes helping students through e-mail just as simple because he can easily use that function to demonstrate how the math problem works.

Without the tablets, he said, he and his students would have had to write those same problems on paper, scan them and send e-mails back and forth to achieve the same exchange.

Myers said that since deploying the tablets, he can provide assistance for students outside the classroom more often. Other departments made similar improvements, said Larry Bryant, director of academic computing for the U.S. Air Force Academy in Colorado Springs.

"The English department uses tablets to critique papers and send them back without ever printing them. The computer science department is using tablets in all the freshman intro computer science courses," Bryant said, adding that other departments appreciate that the tablets still retain all the functional features of a notebook.

Taking a Beating

High performance and durable hardware were essential to the committee's decision because every cadet purchased a tablet with his or her own salary, Bryant said. So Myers put the tablets through rigorous quality testing.

The U.S. Air Force Academy in Colorado Springs, Colo., uses tablets to improve classroom learning.

"We buy high-end machines that are able to satisfy the cadets' requirements for all four years the cadets are here," Bryant said.

Myers said last spring, the department ran a variety of application tests.

"We ran a whole suite of different types of applications to stress test the tablet. We often left it running for 24 hours or more to see if it would lock up," Myers said. "A graphics-intensive program is very tough on a system and causes it to run high cycles. The tablet runs hot the whole time those applications are being used. That was just one of many tests. We expected some lockups, but the tablets performed admirably."

Gateway