

The College of Engineering at Virginia Tech



The College of Engineering at Virginia Tech Transforms Learning Environment with Fujitsu Tablet PCs

Challenge:

Improve its learning environment by finding new ways to present information to students, encourage active participation and creativity in all aspects of the curriculum and improve students' ability to absorb and retain information.

Solution:

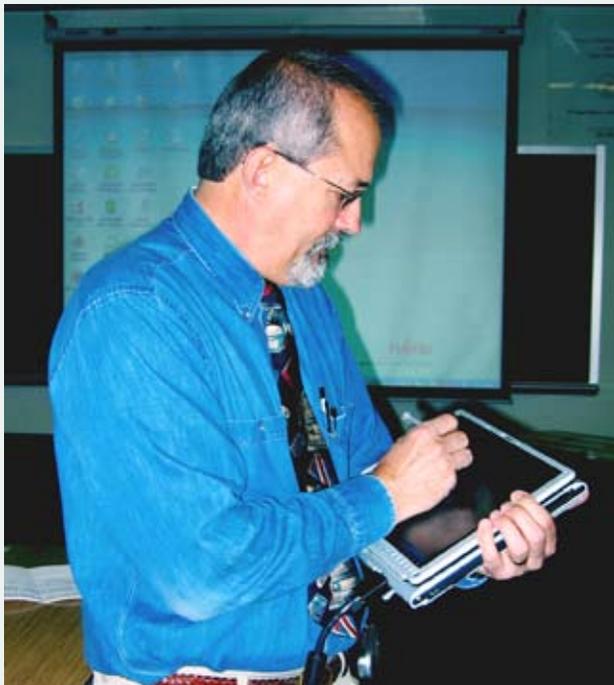
Equip faculty and all 1,400 incoming freshman with Tablet PCs and fully integrate Tablet PC technology into the classroom.

Benefits:

Use of Tablet PCs has transformed classrooms into active learning environments. Student/instructor interaction, student participation and student creativity have all improved since the introduction of Tablet PC technology.

“We selected the Fujitsu LifeBook® Tablet PC based on its reliability and flexibility, and Fujitsu’s years of corporate experience with Tablet PCs. Fujitsu Tablet PCs also provided the best balance of price, weight, service and screen size.”

- **Glenda Scales, Associate Dean for Distance Learning and Computing, College of Engineering at Virginia Tech**



Tom Walker, Professor of Engineering Education at the College of Engineering at Virginia Tech, prepares lecture using Fujitsu Tablet PC.

The College of Engineering at Virginia Tech is internationally recognized for its excellence in engineering and computer science. The college’s 7,000 undergraduate and graduate students benefit from a combination of innovative, hands-on courses and state-of-the-art research centers and laboratories. The College of Engineering is also renowned for its cutting-edge integration of technology and curriculum. In 1984, the college was the first public institution in the U.S. to require entering engineering freshmen to own a personal computer. In 2002, the college moved to a laptop requirement and many of its academic buildings were outfitted to offer wireless communication capabilities. Now the college is once again on the technology forefront, becoming the first and largest public college of engineering to require all 1,400 incoming freshmen to purchase Tablet PCs. The college is also working towards equipping all instructors with Tablet PC technology. The Tablet PC of choice? The Fujitsu LifeBook T4000 Series convertible Tablet PC.

Creating an Active Learning Environment

College of Engineering at Virginia Tech faculty continuously challenge themselves to improve the college’s learning environment. To do so, the team researches new ways to present information to students, encourage active participation and creativity in all aspects of the curriculum, and improve students’ ability to absorb and retain information. To facilitate active learning, the College of Engineering turned to Tablet PC technology. The team felt the Tablet PC form factor and pen computing capabilities provided many opportunities for creativity and active learning that were not provided by a traditional notebook computer.

“We wanted to provide faculty and students with tools to support active learning and interactivity and saw the Tablet PC as being a key tool in helping us accomplish this goal,” explains Glenda Scales, associate dean for distance learning and computing, College of Engineering at Virginia Tech. Always the technology innovator, the college also wanted to help ensure graduating students had the latest technology skills to give them a head start when they hit the workforce.

After extensive research and a pilot program, the College of Engineering at Virginia Tech recommended students purchase the Fujitsu LifeBook T4000 Series convertible Tablet PC, which combines the convenience and familiarity of a notebook with the versatile functionality of a slate Tablet PC. In addition, all instructors of first year students were provided with Fujitsu Tablet PCs to use both inside and outside the classroom. The college is working with faculty members to ensure that they have access to a Fujitsu Tablet PC for teaching. The Fujitsu Tablet PC was chosen for its flexibility, price, weight, and screen size. Explains Scales, “We selected the Fujitsu LifeBook Tablet PC based on its reliability and flexibility, and Fujitsu’s years of corporate experience with Tablet PCs. Fujitsu Tablet PCs also provided the best balance of price, weight, service and screen size.”

Reliability was also especially crucial. “We require incoming freshmen students to purchase the Tablet PC that they will use for the next four years so reliability and durability are of the utmost importance,” explains Tom Walker, professor of engineering education at the College of Engineering at Virginia Tech.

Tablet PCs on Campus

After several months in use, Fujitsu Tablet PCs have been integrated into the learning environment in the College of Engineering at Virginia Tech. Faculty and students are using Tablet PCs on a daily basis both inside and outside the classroom.

Instructors use Fujitsu Tablet PCs to make their lectures more interactive and encourage participation in the classroom. For example, a number of instructors are taking advantage of the portability of the Fujitsu Tablet PC and, using a wireless projector connection, walk around the classroom with their Tablet PCs, interacting with students. While instructors display slide presentations as they did with their notebook computers, the ability to add notes and drawings or simple arrows and circles to emphasize a point has greatly increased the level of student attention in the classroom. “I can’t emphasize enough the advantage of having the ability to mark on the screen when delivering a presentation or a demonstration. It’s an exponential improvement in terms of how the students receive the information and changes the dynamic of the classroom incredibly,” says Walker.

Many instructors post their presentations and notes on their websites. Walker, for example, uses an application to record his voice and everything he presents on his computer screen during his lecture and posts the resulting video file on his website so that students can download and review the lecture and notes again.

The pen computing stylus and digital ink functionality of the Fujitsu Tablet PC has also proven invaluable in helping instructors introduce students to the countless diagrams, drawings and equations that are integral to engineering study. To encourage participation, instructors will ask students to get involved, completing the drawing of a design or solving a problem on their Tablet PC. The instructor can then project both correctly and incorrectly completed diagrams and use the diagrams as powerful, real-time teaching tools.

The pen computing capabilities have also proven to be a timesaver for faculty who are required to teach using hundreds of diagrams. Instructors create diagrams in advance of the lecture and use them as a guide that only they can see during the lectures. Instead of drawing a diagram from memory, the instructor will use the pen stylus to trace the existing drawing, while for students it appears that the instructor is creating the drawing from scratch. Because

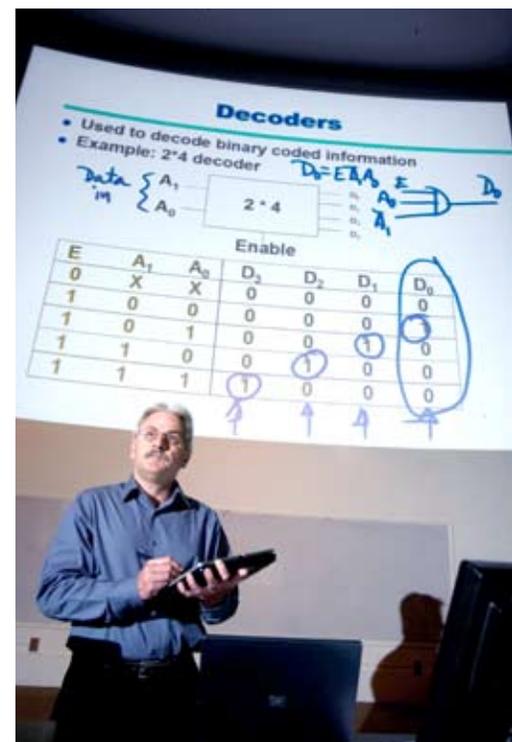
instructors no longer have to commit these diagrams to memory, they are able to concentrate their time on developing more interaction during the lectures.

On the other side of the lectern, students are using Tablet PCs and tools like Microsoft OneNote to take notes during the class. Because the notes are in electronic form versus written by hand in a spiral notebook, students are able to search and organize information more easily. “With the Fujitsu Tablet PC, I have become a much more organized and effective note taker,” says Dan Rizzo, a freshman engineering student.

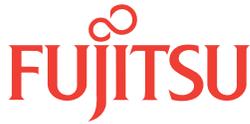
Students are also using the Tablet PCs to interact with one another and work on group projects, collaborating on group sketches and sharing diagrams and notes with individual mark-ups. “Students like the way they can share documents within OneNote and do that frequently when they are working on team documents,” says Scales. Rizzo seconds Scales’s observations. “Using the Fujitsu Tablet PC and Microsoft OneNote is the easiest way to take notes and write papers. When I write papers for English I just bring my Tablet PC to class, open up Microsoft Word and have my peers edit in red right on the document.”

The process of completing, delivering and marking assignments has also been streamlined for both students and faculty. Students now have the ability to complete assignments on their Tablet PCs and submit them to faculty electronically by email or over the Internet. Instructors can use their Tablet PCs to mark and grade the assignments using digital ink and then deliver them back to students.

To keep their Fujitsu Tablet PCs and information secure, many students are taking advantage of the Fingerprint Sensor security feature. Explains Rizzo, “I love using the thumb scanner. It makes me feel important like a business executive. The best part is that it remembers all of my passwords. If a password prompt comes up, so does the biometric authentication device, and all I have to do is scan my thumb.”



Joe Tront, Professor of Electrical and Computer Engineering, uses Fujitsu Tablet PC to teach computer engineering students. The Tablet PC form factor and pen computing capabilities have provided faculty and students alike with a more creative, active learning environment.



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Learning with Technology

While the Tablet PC project is still in its infancy, faculty are already seeing improvements in the classroom environment. Students have been transformed from passive note takers to more active and engaged participants. Explains Joe Tront, Professor of Electrical and Computer Engineering, "We can encourage the 'what if' questions that are so important in engineering education and actually explore those questions in real-time. The portability and flexibility of the Fujitsu Tablet PC is enabling us to get students to actively participate in the learning process, which is fundamental to the active learning style we are trying to encourage." Gone is the barrier between instructor and student and distracting keyboard typing noise that faculty says was present when students were using laptops.

In addition, because instructors can make their presentations, written notes and diagrams from class sessions available online, students are able to fully immerse themselves in the lecture, instead of frantically trying to take notes. "Because both students and instructors are using Tablet PCs, students can spend time looking at what I'm doing, listening and asking questions versus feverishly taking notes. In the end, the student is more active and participatory, which improves learning," says Walker.

The College of Engineering faculty who teach first year students believe that Tablet PCs are enabling both students and faculty to be more creative. "We want to encourage our students to be creative but felt they were being hampered by the standard computer and keyboard. With the Tablet PC and stylus, students can work freely, without the creative limitations found in a traditional computer," explains Walker. In a field that is dedicated to finding creative solutions to problems, that is no small accomplishment. In addition, because the Fujitsu Tablet PC is a convertible Tablet PC, students can also use a keyboard like a standard notebook computer when needed, making it an ideal solution for all of their needs. The introduction of Tablet PCs has been such a success at the freshman level that the next phase of the project is to work closely with faculty from other departments to integrate the use of Tablet PCs into upper level courses as well.

By introducing students to Tablet PC technology in their first year, the college is also providing students with industry leading technology experience not matched at many other educational institutions. "We try to stress to our students that these are tools for their future success. Once they leave Virginia Tech, technology like the Fujitsu Tablet PC is going to give them a valuable leg up on the competition," concludes Walker.



An engineering student uses Fujitsu Tablet PC to take notes in class. Because the notes are in electronic form versus written by hand in a spiral notebook, students are able to search and organize information more easily.