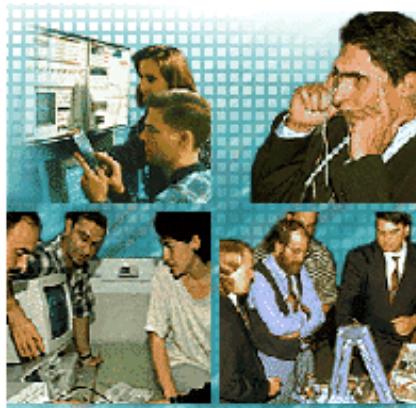


## Case Study: DeVry

### Industry Partnerships Bring Advanced Technology to DeVry Degree Programs

Soon, people who have limited use of their hands will be able to control computers with the blink of an eye.

One possible solution for computer cursor control without a hand-held mouse came from two students whose senior project was a show-stopper at the De Vry Institute of Technology's Technology Day at its Pomona, California, campus.



*The Ocular-Movement-Controlled Mouse is the invention of DeVry Institute of Technology students, David Dorflinger and Scott McKee.*

*The mouse operates by detecting a person's eye movement and analyzing an electro-oculogram--the standing voltage between the front and back of the eye that is correlated with eyeball movement and obtained by electrodes placed on the skin near the eye.*

### Point and Click Become Look and Blink

Following through on an idea they read about in *Circuit Cellar Ink* magazine, David Dorflinger and Scott McKee, students of Dr. A. Kavianpour, developed a microcontroller-based device that detects eye movements as a replacement for a mouse as a cursor control device.

It works like this: Voltage changes that result from looking up, down, left, and right translate into electrical signals. Once the signals reach a certain threshold, the cursor moves across the computer screen. An additional threshold is crossed when the operator blinks, turning the signal into the double-click of a mouse.

To test their design, Scott and David worked with Agilent Technologies test and measurement equipment in the DeVry/Pomona lab facilities. They

used an Agilent 33120A function/arbitrary waveform generator to produce a clock signal for the communications devices and an Agilent 54600-series oscilloscope to test all aspects of the circuit--voltages, frequencies, and threshold levels.

### **Senior Projects Demand Performance, Creativity**

Scott and David's project is the culmination of their electronics engineering technology (EET) bachelor of science degree program.

"At DeVry, we're required to design a microcontroller-based device for our senior project. Scott and I built a microcontroller using a Motorola 68000 16-bit chip--the same processor used in Macintosh computers," said team member David Dorflinger. "Then we had to incorporate the Motorola-based microcontroller into a project with practical applications. We designed our own hardware and software for our device--all for less than two hundred dollars. Our next project might be a virtual keyboard."

(Table) - Electronics Engineering Technology Baccalaureate Degree Program

"Requiring students to complete a rigorous project that incorporates technical knowledge and project management is a tribute to DeVry's understanding of the need to instill more than just technical skills in its graduates. Requiring written and oral communications, as well as user documentation, makes this a true-to-life program," said Marsh Faber, education program manager for Agilent's basic instruments product line.

DeVry's design projects represent true project management. Students work solo or in teams of two. Students submit a proposal to their professor and obtain approval then regularly submit written status reports during the development phase. They also create forecasts and must work within a budget of five hundred dollars. In real-world style, they file reports and other documents. In addition to producing a functional product upon completion, students must develop user manuals and software. Finally, students present their projects to a team of industry judges.

### **DeVry Programs**

The DeVry/Pomona campus is just one of a national system of 13 DeVry Institutes throughout the United States and Canada. the Long Beach, California, campus operates as a branch of DeVry/Pomona.

DeVry offers bachelor's and associates degree programs in electronics and bachelor's programs in various business and management areas. DeVry achieves efficiencies by operating year round and concentrating on programs in selected technology-based disciplines. They offer few electives; every course plays a critical role in developing students' professional abilities. Students can choose from morning, afternoon, and evening classes to help them balance school with work and family commitments.

Upon completion of the EET bachelor's degree, students concentrate their activities on applied design, using current engineering practices. Often, students pursue careers in research and development.

DeVry's electronics technician (ET) associate's degree prepares students for jobs in field service, manufacturing, and sales in industries such as

communications, computers, bio-medical, instrumentation, avionics, and consumer electronics.

## Emphasis on Lab Work

Every technical course at DeVry is paired with a lab course. Students begin working with industry-standard equipment their very first day on campus. Combining hands-on work with theory provides graduates with a well-rounded education.

"Students learn early that theory is different from real-world application. They are required to experiment in the lab with the concepts they've been taught. Some of the best learning occurs when students make mistakes. For example, knowing the ramifications of an incorrectly wired circuit is an invaluable learning tool. Students gain benefit of experience that can't be conveyed in a lecture," said Paul Stephanchick, dean of electronics engineering technology at DeVry's Kansas City campus.

Knowledge of test equipment makes students quickly productive. "We use the equipment to expose students to different technical applications. They need to know what functions and test the instruments will perform so they can apply it to the right situation," said Timothy Staley, dean of academic affairs at DeVry's Dallas facility.

"My colleagues from other universities are amazed at how current our programs are and at the quality of the equipment in our laboratory facilities. At the DeVry/Pomona and Long Beach campuses, we have standardized on Agilent test and measurement equipment," commented Iraj Borbor, dean of technology programs.

## Partnerships Benefit DeVry Graduates

Over the past decade, the job placement rate of DeVry graduates has exceeded 90 percent. Often, students secure employment before they graduate.

"The pace of technological change today means that we're shooting at a moving target in terms of preparing our graduates. That's why we're constantly talking with industry employers.

"We keep up with the demands of the electronics industry by staying in close contact with the people who work in it," said Dean Stephanchick.

Stephanchick's enthusiastic summation: "This is a win-win situation for everyone involved."



*On Technology Day, judges from such companies as Rockwell International Corporation and Hughes Communications*

*evaluate projects based on originality, complexity, usefulness, completeness, documentation, and oral presentation.*

## **No Programming Required: Agilent BenchLink/Scope Used Off the Shelf**

At DeVry's Kansas City, Missouri, campus, Bob Bruns' electronics lab is outfitted with workstations that integrate networked personal computers with test instruments and data acquisition software, including Agilent BenchLink/Scope software for Windows. This powerful software allows students with no programming knowledge to capture, display, and document data from the Agilent 54600-series scope.

Students capture actual waveform data (stored as time/voltage pairs) and then transfer that information to other Window-based applications such as spreadsheets. The Agilent BenchLink/Scope saves data as .pcx or.tif files, which students can electronically paste into their lab reports.

"A technologist needs to be highly familiar and proficient with off-the-shelf technology. Using the Agilent BenchLink/Scope out of the box has been an important part of our students' education," said Bruns.

"When we evaluated equipment for the student labs, we were thorough. We asked five different manufacturing companies to leave their test equipment with us. Our test team included faculty members and top students, and we tested equipment and instrument features to the limit.

"The decision to go with Agilent was unanimous."

*DeVry students have the advantage of working with leading-edge industry-standard equipment that prepares them for real-world challenges. Agilent is committed to working with educational institutions to provide test and measurement equipment that helps prepare students with practical, creative, problem-solving abilities--and helps schools to:*

### **Save Time**

*"When the equipment arrived, there was a booklet of ready-made exercises with it. We tried them and they were easy to use and efficient. They were definitely a time-saver for us."*

Charlot Michel  
Polytechnic University de Cergy  
France

### **Save Money**

*"With the educational discount Agilent offers, it makes it difficult for other manufacturers to compete. It's not that other instrumentation is bad, it's just that Agilent basic instruments have such high performance for the money...there's no question what to buy."*

Dr. Mardi Hastings  
Ohio State University  
Columbus OH

### **Stay Informed**

*"At Agilent, our commitment to education goes beyond providing products that replicate real-world lab environments. It includes services and support*

*that include teaching tools, a World Wide Web site, and publications."*

Marsh Faber  
EMD Education Program Mgr.  
Agilent Technologies

### **Stay Competitive**

*"Agilent offers us basic instruments that fit the needs of the under-graduate classroom, yet, because they are also industry standards, they best emulate the work environment."*

Amin Karim  
DeVry Institute of Technology  
Oakbrook Terrace IL

For more information on Agilent's Education Program, products, services, and support, call:

U.S. 800.452.4844  
Canada 800.387.3154

Printed in the USA 5/96