

Industry, Academia Build Education Partnerships

Corporations are looking to universities to help them educate their engineers and solve business challenges. And universities are looking to corporations to as a way to grow and enhance the educational services they provide.

BY DAVID SIEGEL

At almost every turn, engineers are hearing how lifelong education is more important than ever. In a marketplace where new technologies quickly become old technologies and new knowledge quickly becomes old knowledge, the best professionals will be those who continually update their skills.

This need for lifelong engineering education is increasingly being recognized by universities who, in turn, are devoting more of their efforts to establish partnerships with employers of engineers. Engineer employers are also finding advantages in these partnerships, using the expertise found on campus to keep their employees, and their businesses, competitive.

"We really believe it's a lifelong process of learning, and we want to offer opportunities to engineers throughout their careers," says Cath Polito, executive director of the Center for Lifelong Engineering Education at the University of Texas. While the center has been around for 35 years, in the

last five years there has been a greater emphasis on reaching out to industry and establishing partnerships.

"It's just the nature of the marketplace," says Polito. "Thirty years ago you could have one engineering job for your whole life. That's what people did. Now companies and technology change very rapidly. Folks have to continually upgrade their skills to continue to be marketable."

Plus, as a state institution, the University of Texas is always looking for ways to build its programs, knowing that funding cutbacks are always possible, says Polito.

Among the corporations that the university is working with are Dell, Texas Instruments, the Brazilian oil company Petrobras, and oilfield services provider Schlumberger.

Employers of engineers also see advantages in working closely with universities to get their employees the education and training they need. General Motors has a collaborative partnership with top univer-

sities in the U.S. and abroad to help with the company's continuing engineering education. This is done primarily through the customization of degree programs that fit business units within GM. In one engineering master's degree program, GM works with more than 30 universities.

"There's a lot of interchange between the experts on campus who are doing research and teaching in areas that are considered core automotive technologies, and those people at GM who have been working for many years in those fields or are needing to learn what the universities are teaching about our business," says Diane Landsiedel, senior manager of technical education programs at General Motors.

This year, from January to June, GM delivered almost 150 courses with the help of universities. Among the courses in the core curriculum: integrated vehicle systems design, design for manufacturability, quality engineering, power



train modeling and control, power train dynamics, advanced propulsion, and global automotive safety engineering.

Another benefit of partnering with universities is that it allows GM to cut down on its internal education infrastructure. The partnerships reduce the need to maintain educational facilities, schedule conference rooms, and handle all the other administrative tasks associated with delivering education to employees.

Absolutely Essential

The Army Corps of Engineers is another engineer employer that relies heavily on university expertise. Since 1994, the Corps has had a memorandum of agreement with the University of Missouri at Rolla to provide master's-level education to officers in the Engineer Captains Career Course at Fort Leonard Wood. The Corps established similar agreements with the University of Missouri at St. Louis in 1999 and Webster University in 2001.

According to Kenny Light, P.E., technical director for the department of instruction, students in the Engineer Captains Career Course are granted partial credit toward a master's for courses taken as part of their ECCC training. About 100 officers take part in the master's degree program each year.

Obtaining a master's degree is an important part of the continuing professional development of Corps of Engineers officers, says Col. Paul Kelly, director of the training and leader development directorate. However, over the years it has become tougher for the Army to find the time and money to send captains to graduate school.

"There is no way, right now, that the Corps of Engineers could put 100 captains through their master's programs without using this cooperative degree program," says Kelly. "It's absolutely essential to us, and it's a great partnership."

As well as having a broad-based agreement with the Army Corps of Engineers, the University of Missouri at Rolla also provides a project management course to GM and has a partnership with the University of Southern

California to provide a systems engineering degree to Boeing. UMR's Engineering Education Center, which is part of the School of Extended Learning, offers noncredit short courses, in-house training courses, and engineering consultation services to companies. The school has been offering short courses to working engineers since the late 1950s.

Henry Wiebe, dean of the School of Extended Learning, sees two key factors that are driving the trend toward these kinds of arrangements between industry and universities: the development of the technology that allows the university to deliver quality coursework to the work-site and increased competitiveness at

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companies. According to Wiebe, UMR is continually looking at these kinds of arrangements, like the one it has with the Corps of Engineers. "It's an ongoing type of business for us," he says.

Opening the Right Doors

One person who has seen the importance of these partnerships from both the industry and university perspectives is Geraldine Garner, president of STCS in Evanston, Illinois. Garner, a former associate dean in the School of Engineering at Northwestern University, formed STCS to help organizations retain their best engineers. She found that companies were doing very little to take advantage of the expertise on university campuses. "I see universities as having unbelievable resources that companies should tap into if you just open the right doors," she says.

Today, Garner is working as a liaison between Dell and the Center for Lifelong Engineering Education at the University of Texas. The partnership started with a customized statistics course designed to increase the number of engineers within the manufacturing setting who make good decisions based on sound statistical data.

The partnership then expanded to a course on simulation in manufacturing that was developed by UT faculty and Dell experts, and now Dell and the university are on their third course. Before the partnership began, Dell's only connection to the university was for student recruitment.

"Ripe for development" is how Garner describes academia-industry partnerships on continuing engineering education. "The challenge is that both sides of the street are a mystery to the other side of the street. Corporate people don't always know how to tap into the university resources appropriately," says Garner. "The same is true for the universities. They don't always know

who to talk to in the organization to get things going."

One school with a long history of working closely with industry is Stanford University. In 1954, Stanford established an Honors Cooperative Program to provide graduate education for three companies and 23 employees. The school launched a television network 15 years later to broadcast graduate engineering courses, and in 1995 the Stanford Center for Professional Development was formed. The center collaborates with the School of Engineering and provides a broad range of educational opportunities to engineers, scientists, and technology professionals.

Today, the center has more than 400 member companies, including Boeing, GM, Google, Lawrence Livermore National Laboratory, and Lockheed Martin. Through the company memberships, the center addresses the career-long development of employees. Offerings include engineering master's degrees, certificate programs, graduate level courses, and research seminars.

"What we're hearing repeatedly from companies is [the question], is there a way you can craft a custom education experience that makes sense for my company and my

engineers?" says Andy DiPaolo, executive director of the center and senior associate dean in the School of Engineering.

In one case, Stanford provided Hewlett-Packard managers in China a training program on entrepreneurship and Western business practices. "This notion of contract training or customized training is becoming increasingly more common," says DiPaolo. "Universities are much more sensitive to being aware of what corporations need and then trying to design noncredit, professional education coursework, not coursework for credit or degree."

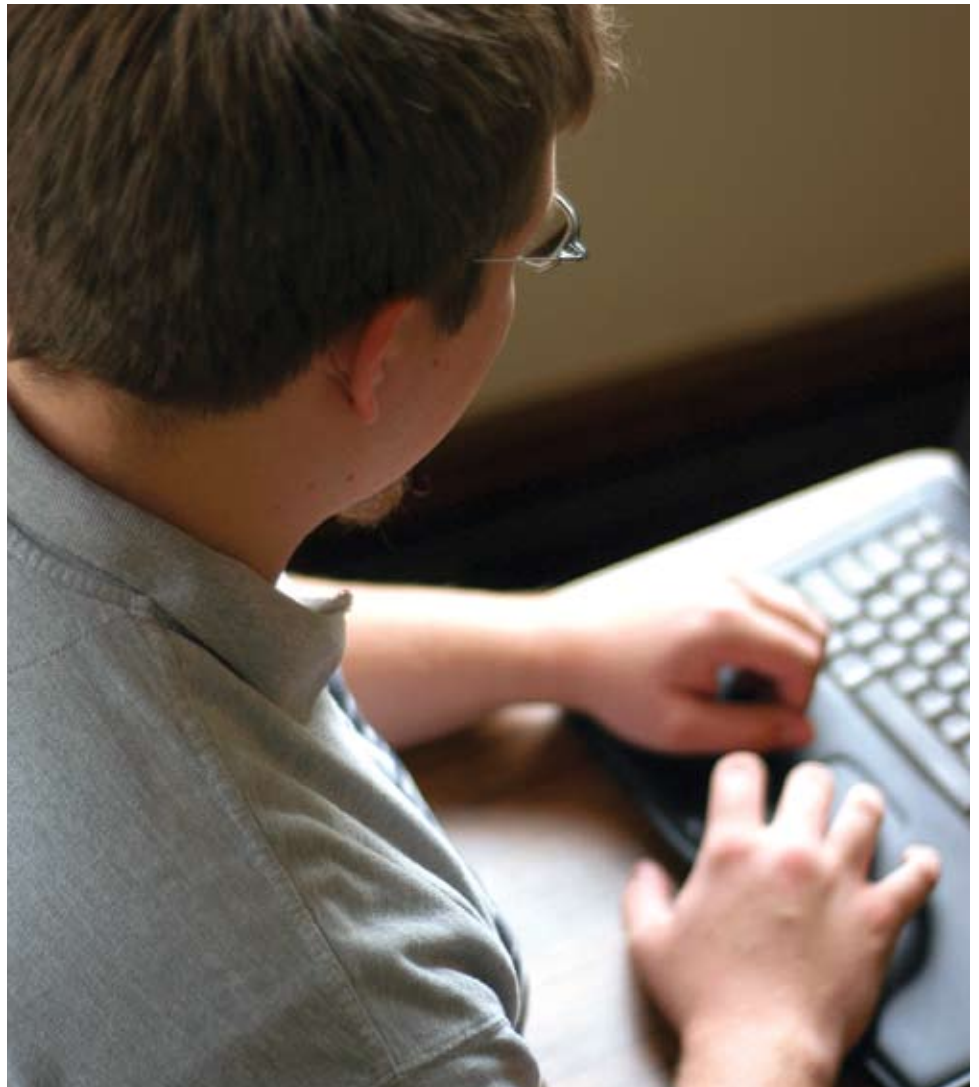
For Stanford and other universities that strive to educate engineering professionals as well as traditional engineering students, the challenge is whether faculty will have the time to take on new projects. DiPaolo says the Stanford Center for Professional Development focuses on areas that match the university's research areas. "We pick our spots," he says.

Staying Relevant

Similar to the Stanford Center for Professional Development is the Center for Professional Development at the University of Michigan's College of Engineering. Center Director Edward Borbely sees a growing trend in educational partnerships between academia and industry. He says that the center's main reason for being is to find out the needs of large engineer employers and then build programs that meet those needs.

"In engineering, staying relevant as an institution really requires us to stay in touch with corporations and government agencies," says Borbely. "If we're not able to serve practicing engineering professionals, it renders us less relevant to the traditional student body because we're not going to be operating in the real world."

Borbely also senses a shift in the graduate education market. "The traditional model just focusing on research-oriented doctoral programs and services is only going to take us so far," he says. At the University of Michigan, he adds, the aim is to establish relationships with engineering



professionals who may not be interested in a doctoral degree or even a full master's degree but "are interested in a coherent set of courses that add up to a body of knowledge that's relevant to them and their company."

While the University of Michigan's Center for Professional Development provides education to employees at corporations such as General Motors, Northrop Grumman, ITT, and Steelcase, Borbely sees a need to also focus on the individual engineer. "What's different, looking ahead, is that we're recognizing we have to go beyond the partnership with the large corporations that can't afford to behave the same way they used to," says Borbely. "We have to think about how we serve individuals in a much more dynamic marketplace."

Even engineering schools that don't have advanced connections to industry are looking to build these kinds of part-

nerships. At the University of Colorado at Boulder, Barbara Lawton, chair of the Engineering Management Program, is working to sell the university's expertise to global companies. The program offers in-house training on topics such as project management, accounting and finance, research and development, and engineering entrepreneurship; six professional certifications; and Six Sigma training.

The program's Web site advertises partnering opportunities that provide direct access to faculty expertise—"a cost effective 'brain trust' for addressing industry or organizational challenges."

"Everyone's looking for how to bring in more revenue, especially in a state school like ours," says Lawton. "The only way that we can build revenue is through partnerships where we can bring money in through the side door. I can't image that others aren't trying to do this as well." **PE**