Educator's Corner : Agilent in Education

Case Study: NJIT

Pioneering Colleges Develop Innovative Program

National Academic and Industry Partnerships make joint engineering degree available at local level

Joe Stewart lives in southern New Jersey. He's just graduated from high school and has big dreams: He wants to be an engineer and work for NASA. Joe's plan is to attend his local community college for the first two years of college, then transfer to a four-year institution. He'll live at home now in order to save money and hold down a job to pay for his tuition.

Today, through a unique educational partnership at Technology and Engineering Center (TEC) in Mt. Laurel, New Jersey, Joe will be able to execute his plan and more. TEC is sponsored by Burlington County College (BCC) and New Jersey Institute of Technology (NJIT). The program will allow Joe to get a jump-start on his degree from a major engineering institution, learn in tip-notch lab facilities and gain real-world engineering experience working with industry.

Best of all, Joe will be able to do this without commuting an hour each way to a major city like Newark or Philadelphia--so more of his time can be spent studying and working. He'll also have a cost-efficient way to find out if he truly wants to be an engineer, since the first two years of his education are at community college rates. Upon graduation, Joe will have an associate's degree from BCC as well as third-year standing as an engineering student NJIT.

While Joe Stewart is fictitious, he is indeed representative of the students who will attend TEC following its opening in September of 1995. The engineering and technology programs offered by BCC and NJIT are providing a model for affordable, top-notch engineering education. They are combining funds to share faculty and resources, as well as constructing facilities at the TEC site.

More Than a Dual Admissions Program

Industry, state and county governments, and educators all recognized the need to offer engineering education and technical training to drive development in the southern part of New Jersey in the early 1980's. Potential students and employees interested in continuing their education and technical training were going to Pennsylvania, northern New Jersey

and New York to meet their educational and employment needs.

To stem the flow of talent to other states, BCC and NJIT began working together; BCC offered an extension of NJIT's electrical engineering program at its main campus in Pemberton, New Jersey. While most county colleges and universities offer dual admissions programs, BCC and NJIT decided to take their partnership well beyond a dual admissions program and developed a joint venture.

Representatives from BCC and NJIT got together, rolled up their sleeves, and began examining and defining what such a partnership should look like. First, BCC and NJIT worked towards a common goal and created the idea of a technology and engineering educational center. In a variation of the dual admissions program, they decided to share resources and faculty. then engaged the county freeholders and the state to obtain money for the joint program that would serve Burlington county and southern New Jersey. They purchased real estate in a prime location, and construction of TEC began. What was a vision years ago is now a reality.

An excited student interacts with carpenters and electricians as they put finishing touches on at Technology Engineering Center.

"People skills are becoming more important in the work place. Competitive pressures have forced us to stop working in a vacuum. People in a typical manufacturing environment have to work together."

This is the first program in southern New Jersey to provide technical and engineering education at a variety of levels. Students can pursue associates, bachelors and master's degrees, as well as training certificates at TEC.

Students enrolling at TEC will receive their first two years of engineering education at community college rates. Their program includes internships with international manufacturers and hands-on lab work from day one with state-of-the-art equipment from Agilent Company. Upon successful completion of BCC courses, students will have earned an associate's degree, as well as third-year standing as an engineering student at NJIT.

"Students go to county colleges for multiple reasons: cost, insufficient preparation from high school, convenience, location," says Joel Bloom, associate vice president of Academic Affairs at NJIT. "NJIT is partnering with county colleges to give students the option of continuing to four-year baccalaureate and master's degree programs. As the state's technological university, we are responsible for bringing instruction to students. We are offering degree programs and continuing education courses that lead to highly rewarding professions and are important to the economic development of the entire state."

Technical Skills Aren't Enough

In today's engineering environments, working in teams and communicating is just as important as having technical skills and knowing how to operate equipment. Jack Reece, principal trainer at Lockheed Martin Government Electronic Systems Division, attests this shift:

"People skills are becoming more important in the work place. Competitive pressures have forced us to stop working in a vacuum. People in a typical manufacturing environment have to work together. At Lockheed Martin, we

are very team oriented."

Employees at Lockheed Martin have a give and take relationship with TEC. On the give side, employees bring their real world experience to the classroom by becoming adjunct professors at TEC. On the other side, Lockheed martin sponsors a Leadership Development Program (LDP). The LDP is a two-year assignment with both on-the-job and university learning. This program is available to TEC students with engineering baccalaureate degrees who meet Lockheed Martin's requirements. Many participants in the LDP are graduates who want to continue their education. Already, a number of employees have enrolled in master's programs offered at TEC.

Asking students to communicate, work in teams and problem-solve takes them beyond what has traditionally been considered engineering education. Traditional engineering education has emphasized basic skills, but very little design. Students spend the first two years taking courses like physics and calculus, but don't see the practical applications.

According to NJIT's Bloom, "When you look at engineering courseware, there is a specific focus in the upper levels that teaches students to design, develop concepts and produce.

Through our program, we incorporate technical education with humanities and social sciences courses that teach students to communicate and work as team members. They also need to understand the economic, social and environmental impact of the work and products they design and develop. More and more of our courses are integrated along these lines."

Horacio Murunta, a senior at NJIT, has benefited from his applied education:
"The reputation of NJIT's programs and co-op work experience makes its students marketable. Our teachers are knowledgeable about real-world problems, and this makes learning interesting. Theory doesn't give you an idea of how to apply problem-solving skills to design issues---hands-on experience and co-op programs do."

Labs Feature Industry Standard, State-Of-The-Art Equipment

With the engineering curriculum focused on design and hands-on exposure to lab equipment, educators at BCC and NJIT sought to purchase industry standard, state-of-the-art equipment for the electronics labs at TEC. After evaluating various test and measurement instrument manufacturers, Dr. Phillip Laplante, dean of TEC, Dr. Ken Sohn, chair of Electrical and Computer Engineering at NJIT and Tony Lambiase, assistant to the chair for laboratories in Electrical and Computer Engineering at NJIT, make the joint decision to work with Agilent Company to equip their lab facilities.

"The ability to have an integrated system from one source was particularly important to us. At all costs, we wanted to avoid piece-mealing the labs together," said Laplante. "Going with Agilent made it easy to integrate all of the equipment. Over the years, Agilent equipment has been reliable--its equipment is student proof," commented Lambiase.

Sohn, Laplante and Lambiase informed Agilent of the types of lab courses that are planned for TEC. There are two separate lab facilities at TEC, one

supported by BCC and the other by NJIT. Lab experiments offered by BCC are introductory and support the first two years' electronics labs and engineering courses. NJIT takes it from there. The lab facility devoted to NJIT houses a full range of experiments for third- and fourth-year students, including labs on power systems, micro-processors and electric motors.

Agilent suggested multi-functional lab equipment that accommodates all requirements specified by Sohn, Laplante and Lambiase. Labs at TEC mirror industry labs by incorporating equipment that is interfaced and controlled by a computer. Lab workbenches feature a whole range of test and measurement instruments: oscilloscopes, digital multimeters, function generators, frequency counters and power supplies. The instruments at each lab station are connected to a PC. With identical equipment in both the BCC and NJIT labs, students will easily transition from BCC to NJIT.

"I think the Agilent equipment used in the lab is an extreme positive for the students. Without the equipment Agilent provides, we wouldn't be properly preparing students. The platforms provided by Agilent begin to give students skills that they are going to need to apply to the next generation of hardware and software. Agilent equipment is broadly educative," Bloom acknowledged.

Industry and Education: A Reciprocal Relationship

Educators at TEC sought input from an advisory board comprised of local engineering and manufacturing companies. "Not only do manufacturers tell schools what their needs are, but they also inform them of what the future looks like. If educators and industry are not talking, students are not going to be well prepared for the work force they are about to enter," states Bob Santare, president of Champion Fasteners and an advisory board member.

Santare goes on to say, "At Champion, we've tried to form a partnership. We can update our skills through technology courses. If we're called on by the college, we can offer students a hands-on learning environment. If students want to come in and see what manufacturing is all about, they can come and work with us. We are moving to a new century where students need internships. With colleges and local businesses linked, internships are beneficial to both parties."

Lifelong Learning

"If you are not constantly upgrading your skills, you are going to have a hard time staying marketable," states Santare. "This joint program will provide people with the ability to stay current on emerging technologies. TEC provides people with the ability to stay current on emerging technologies. TEC provides people with the ability to work and attend classes. This works well for our company, since we do not have to lose employees for 40 hours a week--employees can work and go to school at the same time."

Bloom captures the spirit of the program, stating, "NJIT and BCC both take an applied approach to education. The philosophy of our program is to broadly educate students for the real world--providing the technical knowledge, the communications and human relations skills, and information about the work environment for the upcoming six to ten years. We also need to encourage students to continue their education after graduation; lifelong learning is critical to a successful career."

Marsh Faber, Higher Education Program Manager for Agilent Basic Instruments, "TEC represents academic teamwork at its best. Imagine a system where technical professionals and engineers can come to learn on state-of-the-art equipment, be taught by enthusiastic faculty, and have close ties with local industrial partners. It's the dream of any student to be immersed in this kind of stimulating atmosphere, and we at Agilent applaud these two schools for taking this initiative."

Phillip Laplante, Ken Sohn and Tony Lambiase from Technology and Engineering Center contacted Agilent to help them design an electronics lab that somewhat replicates the NJIT lab in Newark. The goal was to have equipment that would take them into the twenty-first century. Their expectation is to grow into the equipment, as well as grow with it. Lab stations at TEC are equipped with full-featured test and measurement tools from Agilent's low-cost basic instruments line. The instruments at each lab station are connected to a PC.

For more information on products or Agilent's Education Program, call:
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