Engineering Student Success

Practical Experience

At Boston University, complex engineering concepts start early, and creating a good foundation for learning requires exposure to theory and application. After assessing the curriculum, the engineering faculty at Boston University realized something was missing. “We were providing a good theoretical engineering education,” said Gerry Fine, director of EPIC and engineering professor at Boston University. “But we weren’t providing sufficient practical, hands-on experience.” The university’s solution was to create a collaborative, practical engineering class that all engineering students must take by their sophomore year.

To accommodate the 450 engineering students taking the class, Boston University created the 20,000 square foot Engineering Product Innovation Center (EPIC), equipped to handle the constant workload, including multiple FDM® and PolyJetTM 3D printers. “We’re running a thousand students a year through the facility right now. It’s not buried in a basement, it’s become an integral part of the curriculum,” said Fine.

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Aleks Zosuls
Boston University

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Real-world Applications

The hands-on class begins by challenging student teams to reverse engineer a commercially available product. After analyzing its components, structure and functionality, students begin the process of engineering something new. Teams sit down with a client facing a problem then develop a solution, which they refine until the final presentation. Students are developing prototypes for products ranging from air quality monitors and woodpecker deterrents to highly niche products.

One project, from the Perkins School for the Blind, challenged students to create a tape dispenser with the blind community in mind. After rounds of interviews and iterations, the team developed a tape dispenser that automatically cuts tape strips, resulting in easier use by people with blindness.

Because of the nature of the class, 3D printing is an instrumental part of the process. Each team has a mix of students, whose engineering skills and educational background vary greatly. “About 25% of students in this class haven’t used a screwdriver before, while others have done robotics. Some have their own 3D printers at home. We really have the full spectrum,” said Aleks Zosuls, research engineer, instructor, and lecturer at Boston University. “3D printing allows students to iterate quickly, and learn the skills needed to prototype their designs.”

Tools for Success

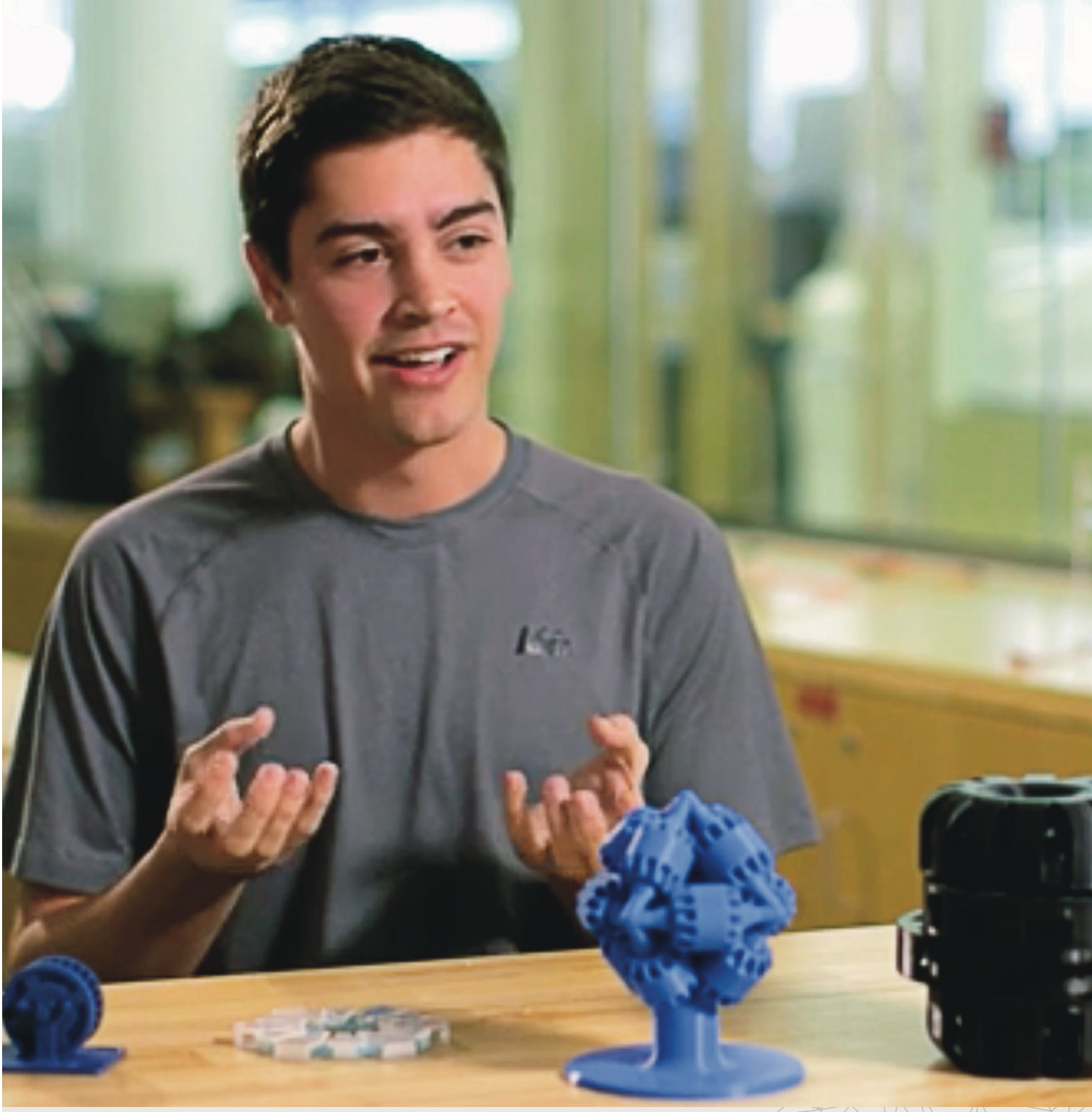
Instructors are careful to let the teams work independently, treating it as if it were a job. “If they were at a company, no one would be grading their homework,” said Zosuls. “There’s no one solution to the client’s problem. By not pushing them to one solution, they get to be more creative.”

“Design experience, learning and creating something, and having that fail and then redesigning it and creating it again, teaches you the ins and outs of using different types of manufacturing processes,” said Kara Mogenson, laboratory supervisor at EPIC.

The results of the class have empowered students, and yielded innovative designs. “When you give undergraduate students professional tools, they achieve professional results,” said Fine. “We want them to be great professional engineers, and the sooner we give them professional tools, the sooner they achieve that goal.”

Kara Mogenson, laboratory supervisor at EPIC

Barry Wu, junior electrical engineer and lab assistant at EPIC



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