

Working Together

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Center brings together students from different colleges to unite for solutions

Companies sometimes struggle to integrate a new process or product with its marketing, finance, management, production or human resources areas. Those challenges require multidisciplinary solutions.

That's where Oklahoma State University's New Product Development Center can give students a leg up: Professors from the College of Engineering, Architecture and Technology, the College of Agricultural Sciences and Natural Resources, and the School of Entrepreneurship challenge students with such real-world problems, teaching them to work together for the best results.

The initiative began in 2006 as part of a U.S. Department of Agriculture higher education challenge grant and originally teamed mechanical engineering and biosystems and agricultural engineering students with agricultural economics and agricultural communications students. Now, interdisciplinary teams are comprised of students from mechanical engineering or biosystems and agricultural engineering senior design courses who work with students enrolled in advanced agribusiness management or entrepreneurship and new technologies courses.

"Often, the best solutions are frequently found not within the depth of a single science, but on the border between disciplines," says **DANIEL TILLEY**, agricultural economics professor and New Product Development Center associate director. "You may not come up with the best solutions when you are focused on one functional area within a company. Coming up with engineering

solutions that make business sense is really important because we want our projects to have impacts on the manufacturing community and the economy of the state."

The NPDC works with the Oklahoma Manufacturing Alliance, OSU applications engineers and manufacturing extension agents to select projects for the courses that provide both engineering and business components for students to complete in 15 weeks.

"We are very fortunate to have such a wonderful connection to Oklahoma manufacturers through the Oklahoma Manufacturing Alliance," says **ROBERT TAYLOR**, research professor and NPDC director. "The applications engineers and manufacturing extension agents have a good understanding of what we look for in a potential senior design project. They are a critical communication link between us and the manufacturer."

When selecting projects as candidates for mechanical engineering and biosystems and agricultural engineering senior design classes, applications engineers and manufacturing extension agents look for projects that have a strong education component, says OSU applications engineer **WIN ADAMS**.

"We go in and evaluate the projects, and if it is something we think a senior design team could handle, we frame it up as a senior design project," Adams says. "The class selects which projects they want to undertake." Once the choices are made, the teams begin researching and developing solutions for their clients, Taylor says.

"It is a real-world class; clients are depending on information students dig up, whether it is good or bad," says **KEVIN KRINER**, School of Entrepreneurship executive-in-residence. "I think that is pretty rewarding for the students. It helps bridge the gap from theory to the real world."

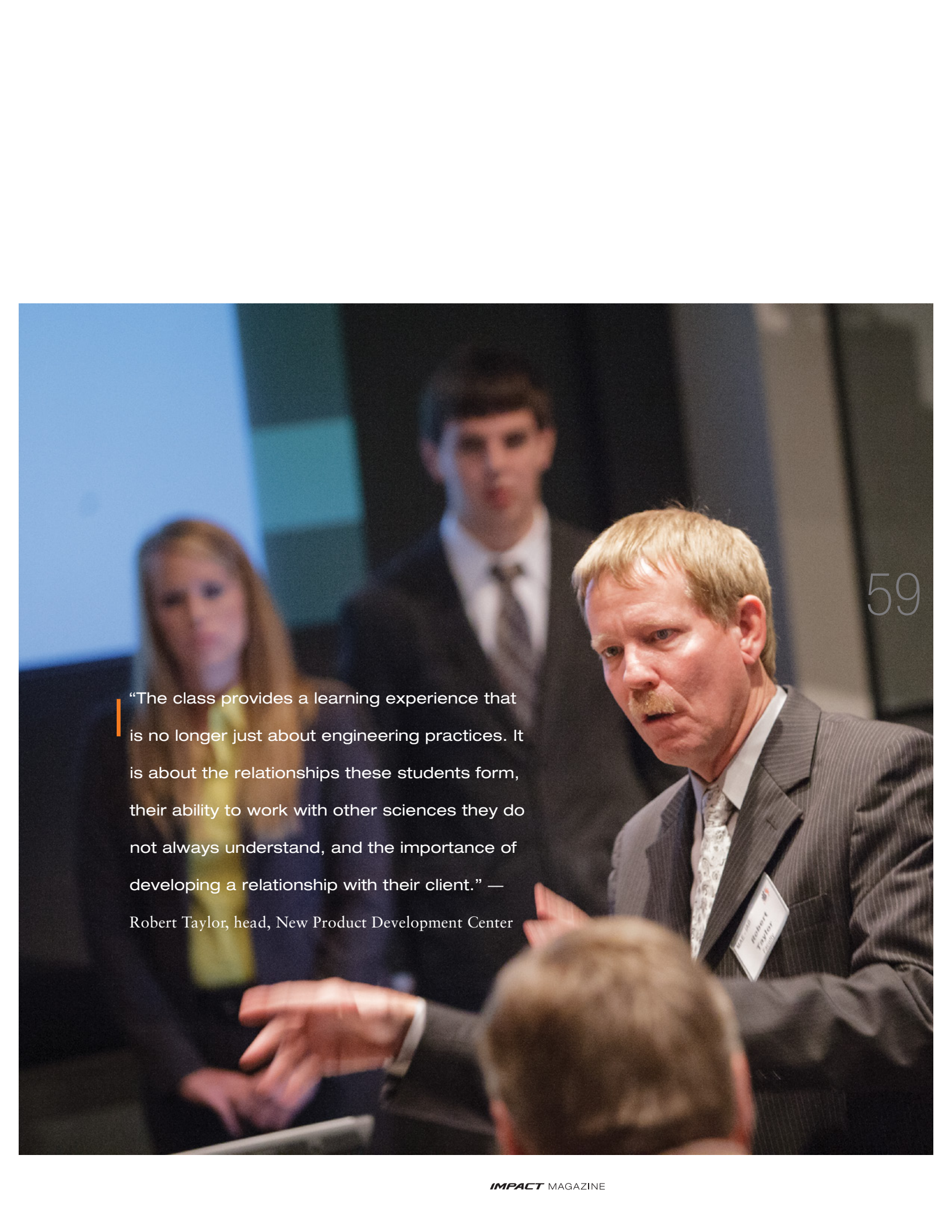
DEVIN KETCHUM, a May 2012 CEAT graduate and product support engineer for Enviro Systems Inc., says the mechanical engineering senior design course helped prepare him for his career. The class allowed him to apply his engineering knowledge to a problem that lacked a predetermined end result, much like he does in his current position, he says.

"Dr. Taylor gave us the project, and he did not give us any limits to what we could do," Ketchum says. "He basically said, 'This is your problem, figure it out.' That really sounds like there was not a lot of support, but in reality, he was there to help us and steer us in the right direction. He encouraged us to think off the cuff, and each week we met with him and were able to see the progress we had made."

The class is designed to give students a broader perspective on engineering jobs, says **TYLER WORDEN**, a graduate student in mechanical engineering and a mechanical engineering senior design teaching assistant.

"Throughout your undergraduate career, you do a lot of projects where you are in a basement and just designing something mainly for functionality and somewhat for how it looks," Worden says.

CONTINUES



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Robert Taylor, head, New Product Development Center

“Here you bring in the aspect of cost and benefit analysis. In general, students get a broader idea of what impact we are having.”

JACOB RAPSTINE, a sophomore agribusiness major, says he gained a deeper understanding of the business aspect of engineering with this project.

“I like hearing the engineering side of things,” Rapstine says. “I had not had the chance to work on many conglomerated projects before this. It is all about the power of teams, and the diversification was very helpful.”

LASHUN OAKLEY, a senior mechanical engineering student, says the course proved to be an invaluable experience.

“No matter what background or department, the ability to mesh with each group is what makes the project better,” she says. “Working with an Oklahoma manufacturing company and the business team has given me insight into this and will be beneficial to me in my career.”

Kriner says such interdisciplinary work allows students to learn to engage with those from other disciplines in order to accomplish a common goal. At first, students have some challenges in merging their disciplines, but by the end of the semester, each team member recognizes the importance of each project component, he says.

“Just about every semester it is difficult at first, but then you see the collaboration grow by the end of the semester,” Kriner says. “It is really neat to watch those teams that really click with the interdisciplinary aspect of things. You can tell when they stand up and present that they are friends, and that they have gotten together and really learned to work as a team.”

Teams are comprised of students from different backgrounds, educational levels and lifestyles, says **RUTH INMAN**, a graduate student going for her doctorate in agricultural education.

“Not only did our team have varying educational backgrounds, our team members ranged from traditional undergraduate college students to students who were married, had children and were pursuing advanced degrees,” Inman says. “This type of diversity mirrors the diversity found in typical workplaces, so I found the experience to be relevant and beneficial.”

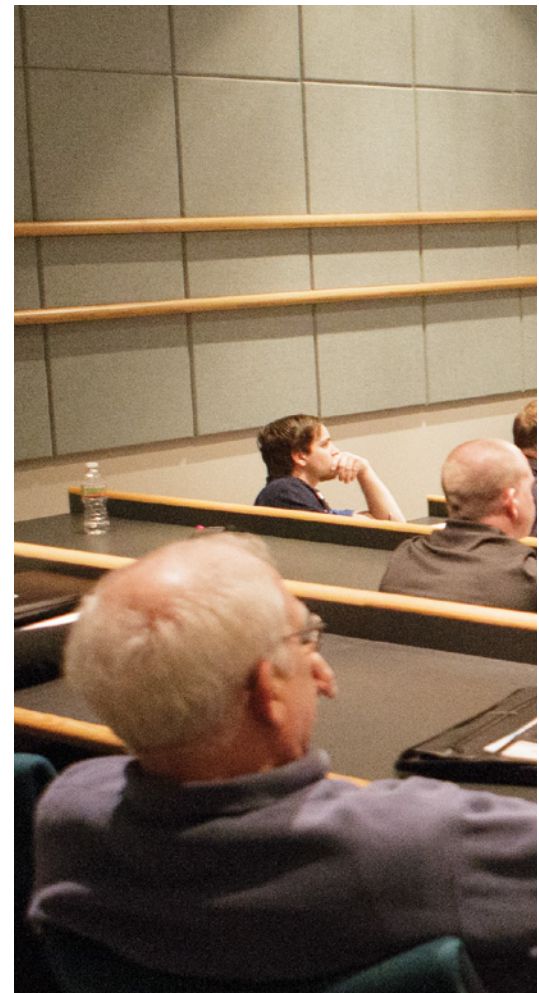
She says the opportunity to interact with a diverse group of students and community leaders helped prompt her decision to take the course.

“One of my goals of taking a class that included a real-world project was to use my class work as an opportunity to develop networks beyond the OSU campus,” Inman says. “This class certainly provided that opportunity. About a month after the semester ended, I was approached by the owner of a local marketing firm who read the report my partner and I produced for class and wanted to offer us a consulting job working on a similar project.”

Taylor says diversity makes this engineering-business relationship such a valuable learning experience for students.

Students come from different backgrounds and educational levels at the New Product Development Center.

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Adams says the unique collaborative efforts offered through these classes make the program attractive to potential clients.

“I believe manufacturers get a fresh, new approach to problem solving,” Adams says. “Students coming out of the program think out of the box and provide fresh, new, crisp ideas to manufacturing.”

He says cost avoidance can be just as critical as providing a company with a new design.

“Cost avoidance can save a company tens of thousands of dollars,” Adams says. “It can be as valuable, if not more valuable, than providing an engineering solution.”

Kriner says this is an important aspect of the team’s business analysis.

“Students help determine if the business idea is viable by really looking at the business model,” Kriner says. “They work with engineers to ask, ‘Can we do this in a way that we can make it cheap enough to make money, and will people buy it?’”

Worden says leadership development is one of the most important parts of the course. Students are given a problem and must work as a unit to discover what works best for their client.

“Students get stuck in a situation where it is, ‘Here is a problem, here is a client, figure it out,’” he says. “There is an obvious growth in students. They open up and are able to talk to clients by themselves and realize the real problems. You see leaders step up.”

These projects not only foster team and individual growth, but also provide the student with a lasting impact on a company, Taylor says.

“A significant percentage of the projects get implemented or lead to implementation of the idea within a company,” he says. “In some cases, the design may not get implemented exactly the way it came out of the senior design class, but some portion or redesign may be implemented.”

□ LORI ALLMON

