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Hands-On Learning : University of Dayton, Ohio

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Hands-On Learning

By Eric F. Spina

At the beginning of the semester Professor Kim Bigelow and Rachel Zidaroff, director of operations for United Rehabilitation Services (URS), gave four mechanical engineering students a modest \$1,500 budget and a challenge — create a prototype of a portable device that would help people with limited motor skills take their work gloves on and off by themselves using just one hand.

“We want a prototype by the end of the first semester, even if it’s made out of Play Doh and dowel rods,” Dr. Bigelow told the team.

Fast forward to the Innovation Center Capstone Design Symposium in December where the team demonstrated not one, but three, prototypes — and a few lessons learned. Their double hook, hoop, and rectangle jig designs, all of which can be easily manufactured on demand on a 3D printer, were not as easy to use for putting on latex gloves as they wanted.

“With all of these, they take a little practice. There’s a little bit of a learning curve,” conceded Aidan Sadler. Added teammate Jake Meyer: “During the concept refinement phase, we had 20 ideas flying around. We’ll do another decision analysis.”

Dr. Bigelow, Rachel, capstone instructors Wenbi Lai and Bill Kaval, as well as the staff of URS urged them to seek more feedback from users and continue to refine the device’s development during the spring semester.

“Let’s work the kinks out,” Rachel told them. “It’s a great accomplishment that you’re this far.”

For these students, this is hands-on learning — literally — and gives independence to employees living with disabilities in their jobs in food service and janitorial work. Our students are helping to create a more inclusive workplace, and, as a fellow engineer, I could not be more proud of their work.

The School of Engineering’s partnership with URS, a local nonprofit that provides a wide array of services to children and adults with disabilities of all ages, is a shining example of the value of experiential learning. Under a five-year, \$107,460 National Institutes of Health grant that’s wrapping up in 2024, students have already completed dozens of projects for URS, including an electric bike with a trailer that can easily transport a local man with cerebral palsy on family bike rides. They’re designing four other prototypes this semester — from a wheelchair stylus that allows an individual to select music from a tablet to a safety seat that lets an older child to sit at the table.

This isn’t all the partnership includes. Professor Allison Kinney, co-program director for the NIH grant, has sophomore mechanical engineering students working on an additional six design projects, and just this month, engineering students modified, tested, and wrapped 27 toys for children at URS who have motor issues and cannot play with traditional toys.

“We had to adapt the circuitry of the toys as well as make a special button for children to press with their elbows or chins to activate the lights and music,” said Dr. Bigelow. “This is something I just love, and I’m so proud of my students.”

This is engineering that matters.

As UD moves into the future, we want to guarantee that every student, no matter their major, will experience a deeply meaningful experiential learning opportunity before they graduate. I applaud these students and their faculty mentors for leading the way.



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