URI engineering project brings joy to amputees in Colombia

December 1 2017, by Elizabeth Rau

Corvah Akoiwala, left, demonstrating a new prosthetic arm to Joysi, a Colombian boy who lost his forearm in an accident. Colombian student Carlos Roa is on right. Credit: Silke Scholz

The boy looked at his new arm and grinned. How does that big thing work? What's with the wires? Circuit boards?

Corvah Akoiwala leaned across the table and pressed a button. The fingers balled into a fist, then burst open. The boy's eyes lit up. Akoiwala asked the boy to try the arm on, and he did. He crushed a plastic cup.

"He just started smiling," says Akoiwala. "That was it. He had no words."

The team clapped—Akoiwala, the University of Rhode Island biomedical engineering student who made the prosthetic arm, and other URI engineering students, all key players in a college project to help four Colombians who had lost limbs.

"The work was hard, but seeing how happy he was made everything worth it," says Akoiwala, who delivered the new arm to the boy, Joysi, in August. "I was able to change someone's life for the better, and that was incredibly rewarding, maybe the most rewarding thing ever."

Spearheaded by URI's Spanish International Engineering Program, "Sustainable Prostheses: An All-Inclusive Approach to Designing in the Americas" was a collaboration with SENA Centro Nacional Colombo Alemán in Barranquilla and made possible by a $25,000 grant from the "100,000 Strong in the Americas" program, a federal initiative to inspire Americans to study in Latin America.

The URI students started working on the artificial arms and hands as far back as March, collaborating with their colleagues in Colombia through emails, Skype and conference calls. "We really got to know them that way," says Akoiwala, of Providence. "Talking, not just about engineering, was really important. It helped us work better as a team."

The Colombian students identified four patients, ages 7 to 60, who had lost limbs, most in tragic accidents. (Fourteen-year-old Joysi's arm was sliced off just below his elbow when he fell off his roof at the age of 7.)

They took measurements of the patients and forwarded those details to URI.

In Kingston, the students made the arms—and, in some cases, hands—with a 3-D printer. They learned how to connect the prosthetics to an Arduino circuit board, and they took a design class to learn how to make an arm, or hand, that is functional and attractive.


TALLER
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Cristian Witcher, a URI engineering student, assembling a prosthetic hand for his patient in Colombia. Credit: Silke Scholz

In June, the Colombians visited URI for three weeks to work on the prosthetics—and bond with their American colleagues. They ate together, traveled to local beaches, and even took a trip to New York City.

The following month, Akoiwala and his classmates—James Gannon of Coventry, Cristian Witcher of North Smithfield, and Laura Parra of Pawtucket, all in the Spanish International Engineering Program—went to Colombia, along with Joshua Gyllinsky, a graduate student studying wearable technology, and Silke Scholz, director of the Spanish International Engineering Program and project coordinator.

Tall with a buzz cut, Joysi seemed nervous when he walked into the laboratory at the Colombian institution on a hot day in August. "His head was down," says Akoiwala. "He's a shy kid. He didn't like all the attention."

Akoiwala had Skyped with him a few times in the spring, but this was their first face-to-face meeting. It didn't help that Akoiwala could only speak a few words in Spanish. He figured the best way to break the ice was to make the fingers move. Joysi liked that.

The artificial arm was too wide so Akoiwala wrapped a cloth around Joysi's upper arm to tighten the fit. He slid the prosthetic—blue and gray in honor of FC Barcelona, Joysi's favorite soccer team—over Joysi's stump. Akoiwala put a plastic cup on the table. Crushed. The potential had revealed itself.

Akoiwala and his Colombian student partner, Carlos Roa, visited Joysi's parents, brother and sister in the town of Barranquilla. The shack was small, with rooms divided by curtains. They talked about soccer, chorizo, and Joysi's new arm.

Roa served as interpreter. Joysi's mother told Akoiwala that she is grateful for what he has brought to her son's life: dignity. "No more teasing," she said, in Spanish. Joysi said he was happy because he could ride his bike with two hands.

The arm is good, but can be perfect. At his lab in Colombia, Roa continues refining the arm to make it look as real as possible. His gift should arrive in the spring. Joysi doesn't have a cell phone or computer, so he stays in touch with his American friend through Roa, who has both. Akoiwala sends an email to Roa, who drives to Joysi's house and shows him the message.

"I'll wish him Happy Holidays in a few weeks," says Akoiwala. "One day, I'll go back to see him."

"Sustainable Prostheses," he says, was not just about engineering. It taught him how to lead his life: appreciate what you have; work hard; live with purpose; abhor cruelty. "Here's a kid who grew up without an arm. I feel proud. I made something that changed his life."

Provided by University of Rhode Island