

ASU students design accessible motorized training wheelchairs for children

Founder of Mobility Independence Foundation says their ingenuity can better lives for kids, their families

By Scott Bordow, ASU News
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How do you design a motorized training wheelchair for children for under \$500?

You buy a \$44 Evenflo booster seat on Amazon. You purchase a \$199 JOYRACER Ride-On bumper car as the frame. You use white PVC piping for the joysticks, mini sink plungers to hold the joysticks in place, and a rechargeable battery as the power source.

Then, if you're Daniel Chaves, a student at the Thunderbird School of Global Management, and Gianna Franz, a first-year student at Arizona State University's West Valley campus, you grab your invention off a table at the 850 PBC in downtown Phoenix on a Saturday morning and show two judges how, with a \$440 investment and easy-to-follow instructions, you've made motorized training wheelchairs far more accessible and affordable for families.

"With a little bit of imagination," judge Fredi Lajvardi tells the five teams of students, "you can totally rock what the industry standard is."

Twenty-eight undergraduate and graduate students from across ASU participated in the Health Care Innovation Design Challenge, a project co-partnered by The Mobility Independence Foundation and the Edson College of Nursing and Health Innovation. Saturday's event was the culmination of a semester-long internship in which students were tasked to design a motorized training wheelchair for kids ages 4–7 that would enable them to practice maneuvering and driving in preparation for their wheelchair driving exam.

ASU's involvement began when officials from Mobility Independence Foundation, or MIF, saw a LinkedIn post from the Edson College in the summer of 2024 about a mobile workstation students had designed for HonorHealth.

Thomas Quiter, MIF's founder, had long been frustrated with the lack of affordable motorized training wheelchairs for young children. The chairs are needed because children have to take lessons and pass a driver's test before insurance companies will approve a regular motorized chair, which can cost more than \$5,000.

"Children who already are medically deemed in need of a power chair have one of the highest rates of not being approved," Quiter said. "It turns out the number one metric for how they actually approve is they put a 3-year-old who's never driven a power chair before in one and see how well they do. And my mind immediately went to, 'Well, people learn how to drive a car before they take their test, right?'"

"So, when they get denied, what we're doing is we're compounding a physical disability with both a cognitive disability, a social disability and what could become a behavioral disability. And that's unnecessary. It's just completely garbage in my mind."

Quiter connected with Michael Collins, the senior director of Health Innovation Programs at Edson College, and Collins created the 15-week internship program, in which students were tasked to invent open-source/hardware training chairs for under \$500. Open-source or hardware means no patents are involved and materials are readily available on Amazon or at stores like Home Depot and Lowe's.

"If it's open hardware and it's low cost, it's very easy for a community to come together and build a premade design with instructions," Quiter said. "It's not rocket science."

The team composed of Chaves and Franz won first place for their chair, which included a seat belt, an optional ratchet for a chair lift and an audio component that included a car engine sound, a horn and music. It also came with a QR code that, once scanned, had the specific chair parts, the tools necessary to build the chair and step-by-step instructions.

Build your own

[View instructions](#) on how to build a child's motorized training wheelchair.

Another team's chair — which cost \$420 — included a 24-volt battery with two dual motors, LED lighting and pool noodles attached to the outside of the chair as cushions.

Several of the teams also built a remote control so parents could maneuver the vehicle if their children were going down a sidewalk or street and lost control.

"It's pretty impressive what they've come up with," Collins said.

The ingenuity of their designs — and the low cost — impressed Lajvardi, a former high school robotics coach who was played by actor and comedian George Lopez in the movie "Spare Parts."

Their work, he said, was an example of ASU's impact outside its institutional boundaries.

"The fact that you guys are doing this as a class project just emphasizes that industry is not paying attention to solving this problem," he said. "It's sometimes unique to be able to find yourself in a position where you're either equal to or ahead of what industry is doing to address this specific problem."

“This could turn into something bigger and change the lives of a lot of people.”

Chaves, who is a physician in Ecuador, said the training chairs could help families around the world.

“I’ve worked with kids in the Andes, and most of the kids that use a wheelchair are using a manual wheelchair, usually an adult wheelchair that they just adopted,” he said. “So, it’s really hard for them to move around, especially in an area that’s not flat.

“I’m hoping to bring this design to kids in South America, and hopefully it makes them more mobile and helps with their neurological development.”

The chairs will not only help children, Quiter said. They will benefit entire families.

“The more that child learns his or her independence, the less work it’s going to be on that family,” he said. “It will give families more time for daily life.”

Collins said that once the wheelchairs are completed — a few of the teams were still working on getting the chairs to turn — the students will present them at a Mobility Independence Foundation event in the Phoenix area this fall.

This story originally appeared on [ASU News](#).

Main image



Ten-year-old Zaiden Mendivil tests out a motorized wheelchair prototype during the HCI Design Challenge showcase held at 850 PBC in downtown Phoenix on Saturday, April 26. The event was the culmination of a semester-long internship where students were challenged to design a motorized training wheelchair or device for kids ages 4–7 that would allow them to practice maneuvering and driving in preparation for their wheelchair driving exam. Photo by Charlie Leight/ASU News

Text image(s)



Physician and Thunderbird graduate student Daniel Chaves (left) shows judges Fredi Lajvardi and Glen Pohle (right) the website for building and repairing his team's \$440 prototype. Photo by Charlie Leight/ASU News