Students' Pill Pal, HugGloves to assist the elderly

December 14 2010, By Ted Boscia

Aiden Payne, center, meets with the student team at work on the self-warming shoes.

Gloves to help relieve arthritic pain and battery-operated shoes to keep feet warm and stimulated are examples of high-tech products that students designed this semester to help the elderly and people with disabilities to lessen pain and go about their daily lives.

With input from local senior citizens, Fiber Science & Apparel Design (FSAD) students conceived functional apparel and assistive devices in the course Textiles, Apparel and Innovation, taught for the fifth consecutive year by FSAD assistant professor Juan Hinestroza in the College of Human Ecology.

The innovations include: the Pill Pal, a watch with three compartments

for pills that discreetly reminds wearers to take their medicine; a shoe powered by a wireless battery that keeps one's feet at the optimal temperature and improves circulation; the Push-Up, a portable seat cushion that gently raises a person from an armless chair; and HugGloves, lightweight gloves that stimulate the hands and alleviate the symptoms of arthritis while the wearer sleeps.

Throughout the semester, students met with seniors to understand their needs and refine their concepts.

"It was an exciting experience to have intergenerational teams, three generations apart, discussing some of the challenges that senior citizens face and, more importantly, proposing solutions for them," Hinestroza said. "The students enjoyed learning the material of the course while providing a great service to our community."

From the initial meeting with seniors, the HugGloves team understood that arthritis degrades the quality of life for many older adults. Painkillers and muscle relaxants provide only temporary comfort, they learned, while electrotherapy showed promise for tissue healing and lasting pain relief.

"Arthritis can be really difficult for older adults and get in the way of their day-to-day living," said team member Lucy Howat '11. "HugGloves can be worn to limit their pain at night, leading to better sleep, and also help stimulate their muscles so they have better range of motion throughout the day."

HugGloves concept poster.

Howat and classmates Xiao Liu '11, Maylian Luo '11 and Irene Leung '11 designed the gloves to be made from a carbon-based fabric that conducts electricity, wicks away moisture and distributes heat evenly across the hands. The gloves have a Velcro clasp, making them easy to slip on and off, and wearers can adjust the frequency and intensity of the electronic muscle stimulation, which is delivered to 10 nodes embedded in the fabric.

"Our goal was to create something accessible that would be easy to use and could make a big difference for pain management," said Liu '11. "We really worked hard at this project and believe that it will help senior citizens and make their lives a little more comfortable."

Hinestroza asked the students to integrate sustainable components into their designs. The Push-Up seat cushion, for instance, would be constructed from recycled aluminum, while the heating shoe uses an implanted piezoelectric generator to recharge the battery from the movement of walking feet.

Each team is also likely to submit their product designs in the 2011 Cornell Big Idea Competition.

"The solutions developed by the students were highly innovative and clever," Hinestroza said. "Some of them could actually be very good business ideas as well."

Provided by Cornell University

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