The Colorado Health Foundation™

Technology: Can It Ease Disability Instead of Add Confusion?

Every morning when Mary Johnson climbs out of bed, she turns on her Samsung Galaxy tablet and touches a large green app with a white checkmark in the middle. The app sends a message to the front desk at Clermont Park, a retirement community in Denver where Johnson lives. The message notifies the front desk that Johnson is fine and ready to start her day.

Johnson, along with 167 other residents, has embraced the tablet technology to communicate within the community and to keep in touch with friends and family living elsewhere.

“At first, I thought there was too much information and the instructions were too complicated,” Johnson said. “I am a one-two-three person, so I worked through the instructions and came up with a simpler way to teach it.” She soon became Clermont’s go-to person for tablet instruction and later delivered a speech about the program at the LeadingAge conference in Denver.

While technology can improve the lives of seniors and younger people living with disabilities, constant changes in equipment and machinery can leave people frustrated and sometimes overwhelmed. Helping people find clarity and utility from technology is a constant challenge for the long-term services and supports community.

Clermont launched its tablet program with a pilot group of 10 in the fall of 2012. Although success did not happen overnight, the program was implemented throughout the entire facility in the spring of 2013. Today, Clermont has 200 residents in its independent living facility, and it boasts a 90 percent participation rate in its tablet program.

“It was a major undertaking because some had never used technology or a computer,” Johnson said. “I had used a computer, but I am not a tech person. My phone is an emergency device, and it isn’t ‘smart,’” she added with a smile.

Elsa Wysick uses her tablet to keep tabs on her children and grandchildren. “One of the things that is so great was the opening up of another world,” Wysick said. “My children talked me into it.”

Before adopting the tablets, Clermont used a ring system much like do not disturb signs found in hotels. The concierge staff monitored the rings that residents placed on their doorknobs every night and checked in the morning to see that they had been removed, indicating that residents were awake and fine. If a ring had not been removed, the concierge would knock on the door.

The app has eliminated the concierge and some of the human touch, but Clermont has created a virtual community by adding other apps, including a message board, activities, a staff and resident directory with photos, a slideshow and a program that enables residents to schedule maintenance and work orders. In addition, residents have unrestricted access to the Internet.

Johnson uses her tablet to Skype with her sister who lives in St. Louis. She also has a Facebook page to keep in touch with her grandchildren and uses the tablet search engine to research topics that interest her.

For Wysick, Facebook takes too much time. “I really do not care if my grandchildren have brushed their teeth in the morning,” she said. “I would rather spend my time talking to my friends.” Wysick said that although she likes the technology, she does miss the personal touch and the knock on the door when she left her ring on the doorknob.

“When we got people to be unafraid of the tablet, it changed the attitude,” Johnson said. “The community became an ‘I can’ place, where we thought if we can manage the tablet, there is nothing we cannot try.”

According to Clermont staffer Kayleen Gibson, the tablet program is part of a long-term plan to prepare for the next wave of residents, the baby boomer generation.

“Our CEO is always on the edge and asking what we are going to do next and how do we prepare for the next generation for whom technology is a must.”

Adapting for All Generations

In another part of metro Denver, a printer arm turns quickly inside a clear box retracing the same pattern, laying strand upon strand of thin blue plastic the diameter of fishing line. As the printer motor hums, a business card holder takes

shape. The finished piece is a duplicate of the universal symbol used to designate handicapped access in parking lots and other public places, in 3-D miniature.

The holder was designed by Joshua Winkler, whose work focuses on solving problems for people confined to wheelchairs, a world he has known for much of his life.

Winkler was born with a defect in one of his legs that left him with a limp. An automobile accident in high school resulted in a broken neck and confinement to a wheelchair. After completing a master's degree in mechanical engineering and work on a NASCAR team, he launched Cripple Concepts, a company that designs and manufactures adaptive equipment that makes the lives of people in wheelchairs a little easier.

I want to make everyday devices more user friendly," he said as he rolled his chair out from under a milling machine atop a retrofitted bench.

His workshop, located in an oversized garage behind his home in Aurora, includes computer-controlled lathes, milling machines, a router, a modified hydraulic pipe bender and the 3-D printer. Winkler described the equipment as "high-end hobby and low-end professional" tools.

Winkler redesigned and retrofitted the entire shop. Machines that normally would sit on the floor have been placed on benches, allowing Winkler to roll his wheelchair underneath. Hydraulics and computerized mechanisms that can be programmed to cut, bend, saw and mill large pieces of metal assist with work usually done by hand.

He brings the same engineering skills to his work designing and building adaptive devices, including user-friendly USB charging ports that attach to the arm of a wheelchair. The port's prototype was built with the 3-D printer and mass-produced in China.

Winkler replaced the flimsy rubber control stick knob on his own chair with a metal one turned on his lathe. Word-of-mouth eventually led to production of several more for friends. And he redesigned the leg rest on his chair to include a rubber bumper to protect his legs and feet.

A bird nest of thin clear tubing is the makings of a cooling system called the Cripple Cooler. It is a work in progress that sits on a bench next to the printer. “Sweat is a problem for people with paralysis,” Winkler said, because nerve damage alters the body’s ability to regulate temperature. His earlier work with NASCAR’s driver cooling system was the inspiration. Winkler also plans to make a modified backrest using a network of cooled tubing.

“All of the machines and tools are designed to make things reachable. My whole life works that way.”

Giving Voice (Recognition) to the Injured

On a sunny afternoon at Craig Hospital, a young boy belts out a tune before a crowd of spectators attending the annual Craig Talent Show, while patients in wheelchairs maneuver in and out of customized vans to attend appointments or to work out in the gym.

Meanwhile, in a sun-drenched lab on Craig’s fourth floor, assistive technology specialists Jill Baldesarri and Erin Muston-Firsch work to make technology like smartphones, tablets and voice recognition devices a little easier for patients using wheelchairs.

Baldesarri demonstrates a voice recognition product called Echo, developed by Amazon. She instructs the small desktop tower, which the staff has named Alexa, to “play Pandora.” Soon, blue lights begin to glow atop Alexa and the Disney station starts to play.

"Just by talking to it, you can create shopping lists, listen to audiobooks, create music playlists and save things to a calendar," Muston-Firsch said.

"What used to be super expensive has evolved and become more reasonable," Baldesarri explained. "The tower costs under $200."

In some cases, this technology can cut back on the need for round-the-clock caregivers, allow for greater access to hobbies and creative activities, and contribute to longer independent living situations.

In addition to Echo, the lab at Craig offers adaptive technology that can control doors, open and close window shades, and turn lights and appliances on and off. Technology known as the Nest allows people to control household thermostats remotely. And voice recognition available on iPhone, Android and Google devices can open email and enable hands-free application of services like Siri.

Apple has also created technology to provide warning systems for those with spinal cord injuries, for whom weight shift is extremely important. Long periods of sitting in the same position can cause skin sores. "The app can be customized for individual injuries, and intervals can be set to account for the time between weight shifts and the time it takes to shift your weight," Baldesarri said.

Some apps offer photos of different meds to make sure a patient is taking the right pill. And sip-and-puff joysticks attached to wheelchair arms not only allow patients to maneuver their chairs, when paired with phones using Bluetooth, different durations of sips and puffs can control applications on a smartphone.

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> Mary Johnson, resident, Clermont Park retirement community

The lab is beta-testing infrared technology like that used in TV remotes to eventually control more practical household apps through a smartphone. For now, this technology is for recreational use only. Products like the Griffin Beacon, RedEye and the Flipper work through home Wi-Fi, Bluetooth or cable boxes, allowing users to control television program lists or games, and then watch with just a tap on an on-screen guide

Voice recognition tools, including Dragon for email, word processing and Internet navigation, are also available through the lab.

“If someone wants to pursue a hobby, we try to help,” Baldesarri said. This includes adaptive gaming apps with modified controllers. “Games have proven to be a great activity for those confined to a wheelchair. They are a great way to connect with friends and others in the community.”

One patient who had been a pianist wanted to play a keyboard. Craig created a mouth stick enabling her to play. Eventually she became proficient enough to play and record music. She then mixed the piece on an app known as GarageBand using hands-free technology.

“We want to make it easier for people to control their environments with technology, and we have come a long way,” Baldesarri said.

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