

Transcript: A Helping Hand From a Robot

Reported by Lisa Raffensperger

Lisa Raffensperger: In a condo in a residential part of Pittsburgh, researcher Matt Lee sits on a couch next to a man we'll call Rob. He's giving Rob a memory quiz about a trip to the zoo he took two years ago.

Rob: ...different animals, I think they had birds in one section ... I remember, vaguely.

Lisa Raffensperger: But as it progresses, Rob hesitates.

Rob: Did I see lions and tigers and gorillas? I'm not sure; I think I might've.

Lisa Raffensperger: Rob is in the early stages of Alzheimer's disease, a form called mild cognitive impairment. He was diagnosed four years ago. Now, says his wife, Sandy ...

Sandy: His memory for what happened 40 years ago is good. It's what happened yesterday or two or three days ago or this morning.

Lisa Raffensperger: But for a while after this zoo trip, two years ago, Rob could remember it in detail—in fact, for almost a month, a very long time for someone with memory loss.

Lisa Raffensperger: What made the difference was an intelligent memory recorder, called the MemeXerciser. The device was developed at the Quality of Life Technology Center--a joint engineering research center between University of Pittsburgh and Carnegie Mellon.

Lisa Raffensperger: The MemeXerciser is a wearable cluster of sensors that automatically records memories. There's a camera that goes around the neck of the memory-impaired person and an audio recorder in their pocket. A separate GPS unit tracks their location.

Lisa Raffensperger: Then the memory-impaired person and a caregiver go out on "experiences"—a trip to the museum, for instance.

Lisa Raffensperger: And what happens next is really the transformative part. The software sifts through hours of data to pick out "cues." Cues are the threads your mind might pull on to evoke the whole rest of a memory--someone you met, maybe, or what your spouse was wearing. It's similar for people with early Alzheimer's, says Ph.D. researcher Matt Lee.

Matt Lee: We know that people in early stages of Alzheimer's disease, they can still remember their memories; they just need a little bit of a hint.

Lisa Raffensperger: Image and audio cues are paired together. Finally, the caregiver can record narration on the photos to give personal meaning. The end result is an interactive slide show, displayed on a small tablet computer.

Lisa Raffensperger: Like Rob's zoo memory. He clicks through it with a stylus.

Lisa Raffensperger: The simplicity of the device masks its ingenuity. In trials so far, patients were able to remember ...

Matt Lee: Four weeks after the experience, which is a long time for people with mild cognitive impairment or Alzheimer's disease to remember the kind of details of the experience.

Lisa Raffensperger: Patients recalled more details after using the robot than after talking through the memory with a caregiver. And they reported more confidence in those recollections.

Matt Lee: Sometimes with quality of life, when you're thinking about it from that perspective, confidence in memory might be even more important than actually having good memory abilities—to feel at ease with yourself and not constantly having to doubt your own abilities.

Lisa Raffensperger: Lee thinks these positive results are because patients can relive their memories alone and at their own pace. And that frees the caregiver, too, from what can be a tiring repetition of reminders.

Lisa Raffensperger: The MemeXerciser is just one of many intelligent systems being developed at the Quality of Life Technology Center to complement human skills and help fill the gaps. There are robotic arms to reach for things in the kitchen, smart wheelchairs that could navigate through doors on their own, sensors on a pill bottle that may someday record whether a person's taken his or her medicines.

Lisa Raffensperger: The thing that ties all these technologies together is awareness, says executive director Jim Osborn.

Jim Osborn: We look at a computer being able to interpret what a person is able to do, what a person is doing at the moment, if that person needs any type of assistance at the moment, and what the right type of assistance is to provide. That's what awareness means. And that's our secret sauce.

Lisa Raffensperger: But accomplishing that human-computer collaboration means breaking some molds.

Jim Osborn: We've all been striving for these systems, these robots to be able to do as much as they can with as little human involvement as possible. But maybe there's--we've leapt too far forward to making robots work by themselves, to the sacrifice of paying attention to what they could do together with people.

Lisa Raffensperger: And in fact, engineering collaborative systems that respond to human needs requires a different way, says director Takeo Kanade.

Takeo Kanade: In order to do that, surprisingly, you actually need higher technology than just looking for autonomy. Because at the end, the best system is, the system can do everything if

needed, but based on what human can do and also what human wants to do. Actually, it let human do what they can do, and collaboratively we get the best, not only result, and also best satisfaction.

Lisa Raffensperger: It's that same satisfaction that's on display back in the condo living room. Rob and Sandy sit talking on the couch.

Sandy: Do you remember where we're going to dinner tonight?

Rob: We're going to a relative's.

Sandy: Which relative?

Rob: Jack and Ruth.

Sandy: Very good. That's terrific, because a lot of times, you don't remember. This time it sunk in.

Rob: What's your name again? I winked at her when I said it!

Sandy: I saw, I saw.

Lisa Raffensperger: It's one of those small successes that make up the satisfaction of a life.

Lisa Raffensperger: I'm Lisa Raffensperger.