



The Future is Here: Memory and the Machine

Advances in technology and research help individuals with memory problems rediscover their independence and quality of life.

Teaching someone to learn something new when they can't remember what they had for lunch might seem like an exercise in futility.

And if they're already in the first stages of Alzheimer's disease, you may ask, what's the point?

"That's exactly the point," says Baycrest psychologist Dr. Eva Svoboda. "We've still got a window of time to intervene and keep their memory functioning where it is."



Dr. Svoboda is part of a groundbreaking pilot program at Baycrest for individuals who have memory issues, or the early warning signs associated with Alzheimer's, also known as Mild Cognitive Impairment (MCI).

The program also includes Baycrest psychologist Dr. Kelly Murphy, as well as Baycrest psychologist Dr. Brian Richards, who created the Memory-Link program. Memory-Link is a Baycrest rehabilitation program that teaches individuals with amnesia to use a handheld electronic organizer as a memory aid.

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While a person with well-functioning memory may occasionally forget the name of a recent acquaintance or the contents of a short shopping list, a person with MCI will frequently have trouble remembering the names of people they have met recently, or will have an increased tendency to misplace things like house keys.

"MCI is not subtle," says Dr. Guy Proulx, the director of psychology at Baycrest. "If it starts happening to someone you love and care for, you'll know something is wrong."

The pilot program involved six clients with MCI, who were given intensive training on handheld electronic organizers, using key memory techniques and strategies similar to those used in the Memory-Link program.

"We can identify and help people four or five years before they develop dementia, before they become totally dependent," says Dr. Proulx.

"Technology is working wonders as a tool to help people with MCI.

"From research, we know memory is not one thing, it's many things. When it deteriorates, there are still some beautifully preserved functions," he says.

"The episodic memory system gets damaged first," says Dr. Svoboda. "That's memory for everyday activities, like what you had for lunch."

"One of the systems that's usually preserved is semantic memory. This system stores general knowledge about you, the world, and vocabulary – those types of things," she says. "Another is procedural memory, which is learning to ride a bike or play the piano."



Based on the format of the successful Memory-Link program, the first step was forming a participatory design group. “That included a few psychologists, a computer science technician, and several clients with MCI,” says Dr. Svoboda. “We asked our clients what they wanted help with, and everything they told us kept pointing to an electronic organizer. They said they needed an everyday calendar, somewhere to write down phone numbers and keep notes.

“But the average age of the group was mid-70s, and most of them were retired. Some of them had never even used a computer,” she says. “We realized the tool we were developing for these clients had to go beyond a little paper booklet. But we didn’t know how this older generation would take to something technology-based,” she explains.

It turns out, the research team was in for a surprise. “When our clients came in for their first one-on-one training session, they didn’t know anything about computers,” she says. “But by the end of the session, even those who were most techno-phobic were saying it was so easy, they couldn’t believe it.”

A number of different methods were used to teach clients to tap into their functioning memory systems, while taking into account their impaired memory.

“Initially, we were just showing our clients what to do, but then we started guiding them as they started using the electronic organizer, so we were offering ‘environmental support,’” she says. “That tied into something we call ‘vanishing cues,’ where you initially give a lot of support, but then slowly take it away.

“There’s a lot of repetition to ensure what we call ‘errorless learning,’” she says. “They’re not allowed to make mistakes because if their episodic memory isn’t working, they can’t learn from their mistakes. They can’t remember the right way from the wrong way. In fact, making mistakes just makes things worse and they can get very confused. It takes a lot of patience on our part.”

During each session with Dr. Svoboda, an activity such as entering an event into a calendar function on the electronic organizer was broken down into 15 small steps. “We start out simple, (how to enter things for today), then we build, (how to put things into the future, how to attach notes), and then we get into the digital camera and voice recorder.”

“It also provides relief for the family and caregiver, which is very important.”

Sessions during the pilot project were spaced out twice a week, a method called “spaced repetition,” to keep the data fresh. There were 10 one-hour sessions, each of which focussed on an event that the client would learn to load onto their electronic organizer.

Dr. Svoboda and her team were impressed to find that their protégés started using the electronic organizers in quite innovative ways. “One of our clients became a whiz at the technology,” she says. “He downloaded Google Maps to his electronic organizer, and showed me how to use it. I’d never used it before.

“Another client took a picture of their different coloured pills to distinguish their evening pills from their morning pills.

“All we did was tutor them, and they went way beyond what we showed them,” she says.

The project is funded by Sportsfest, an annual event in which participants engage in a variety of team sports to raise funds for Alzheimer’s research and care at Baycrest. Organizer and Baycrest board member Jordan Banks says, “This research takes technology to people who need it the most. It enables people to remain independent, and the longer you can maintain that, the better.

“It also provides relief for the family and caregiver, which is very important,” he says.

The next step is to develop software for the electronic organizer geared specifically to the needs of people with MCI. “We’re still in the formative stages with our participatory design team,” says Dr. Svoboda. “Our clients are telling us what they



need to remember, like names, current events and everything from gardening to music.”

The overall point of the program is to prolong the ability of someone with MCI to function in everyday life and stay engaged with their family and friends. “These people we’re working with now are giving us a lot of good ideas,” she says. “We’re the ones learning from them.”



Dr. Brian Richards introduces a client to her electronic memory aid.

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