



Understanding breakdowns and remote caregiver remediation in authentic task support environments for people with cognitive disabilities



Jim Sullivan, PhD Co-Director, Cognitive Levers Project, University of Colorado
Andy Gorman, Co-Director, Cognitive Levers Project, University of Colorado
Anja Kintsch, Assistive Technology Specialist, Boulder Valley School District
Alex Andrews, Imagine!Colorado, Boulder Colorado

Background. Over the past decade, smart home environments have emerged that include smart sensors and prompting systems to assist residents with cognitive disabilities during daily living tasks, such as meal preparation and household chores. Issues with such “standalone” approaches include:

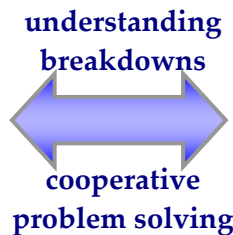
- prompts or scripts may not precisely correspond to the resident’s task environment (e.g. the chicken recipe calls for cooking spray, but only olive oil is available);
- unexpected events may occur (e.g. a phone call may interrupt a meal task while food is cooking on a hot stovetop); or
- a resident may have a bad day and need emotional support to complete the task at hand.

Goals. To support new models for community living, this project has designed and evaluated task support systems that:

- support a resident who is motivated to independently complete a daily living task;
- enables a trusted caregiver to remotely monitor resident progress in a task; and
- support problem detection and remediation when caregiver help is needed.

Findings. This research confirmed that all task events cannot be anticipated and scripted in advance, leading to breakdowns in naturalistic environments. This has led to a nuanced understanding of:

- a taxonomy of the natural problems that emerge during daily tasks in real home environments;
- the cooperative problem solving and remediation strategies used by caregivers and residents when such problems occur; and
- the value of an interleaved technology development and “in-situ” assessment methodology.



Prototype resident prompting system (left), and an “in-situ” evaluation study with a resident in their own apartment and a caregiver remotely supporting a daily living activity.

Potential application areas.

- independent/semi-independent living models for residents with cognitive disabilities within a Community-Centered Board (CCB) caregiver network;
- families considering an independent living setting for a child with developmental disabilities;
- elders with early cognitive decline; and
- diagnostic and rehabilitation supports for veterans and victims of traumatic brain injury.

