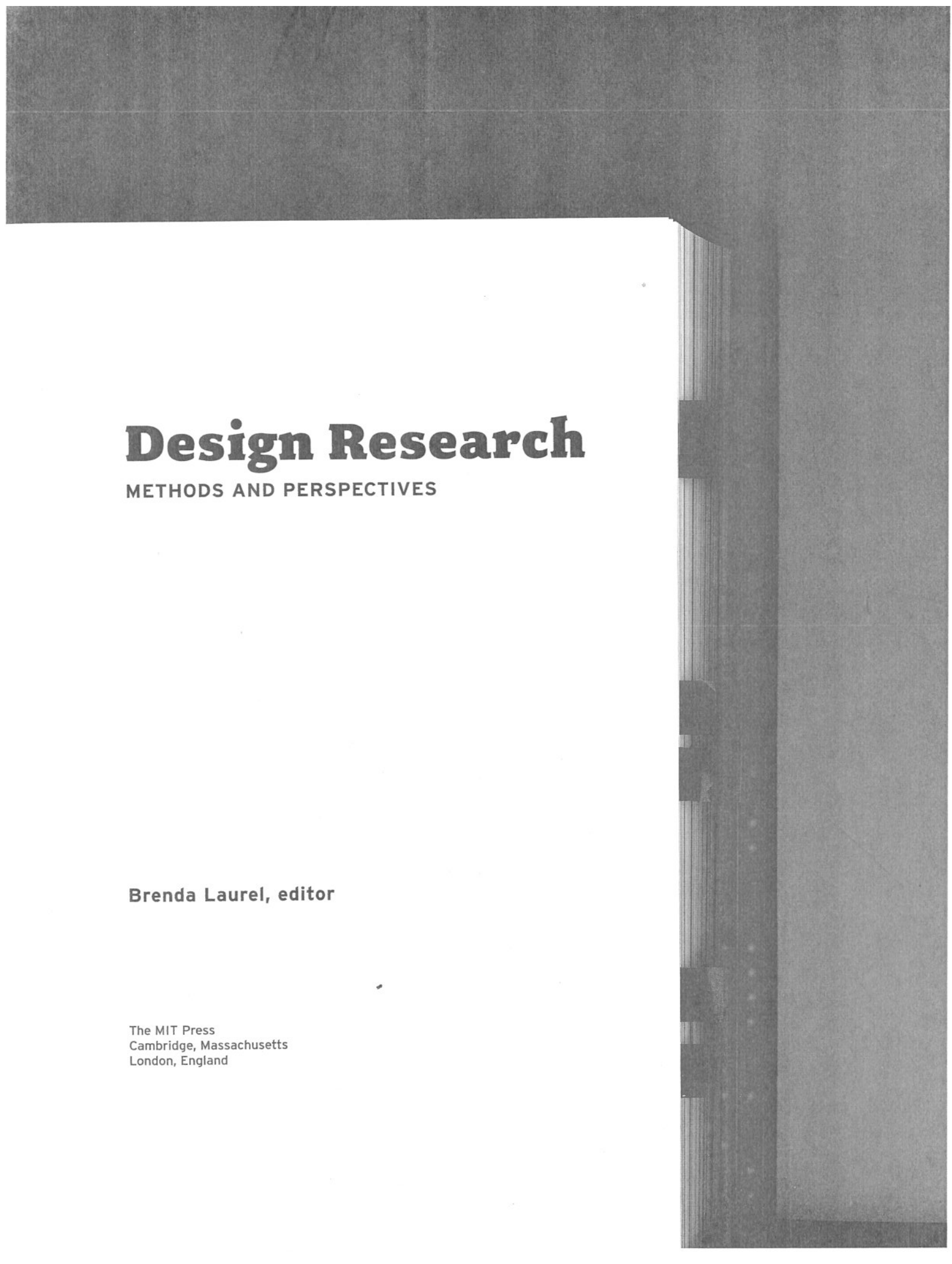

Design Research

METHODS AND PERSPECTIVES

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Designing for the New Old

Asking, Observing and Performing Future Elders

ERIC DISHMAN

Designing for a Disruptive Demography

> *The beginning of the 21st century marks the end of the period of human history with more young people than old, and for the rest of human history, there are going to be more old people than young, unless there are some very major surprises.* —Joel Cohen, *Guardian*, August 2001 [Meek 2001]

While our Y2K worries about old computers "retiring" at midnight filled the cable TV channels, a more significant "old age" phenomenon snuck onto the scene with hardly a headline: the dawn of the age of the aged. Already over-burdened healthcare systems will face a worldwide wave of retirees who will live longer, cost more to treat, and demand new goods and services to help them stay active and independent. What will this age of the "new old" look like? How can design research inform the next generation of technologies to support this next generation of elders?

I started asking some of these questions at Interval Research in a 1993 project called ElderSpace. Here in 2003, I am again trying to design technologies for future elders in an Intel Research project called Proactive Health [www.intel.com/research/prohealth]. I will use these two projects to describe diverse techniques for conducting design research into peoples' everyday lives. In particular, I will explore how theatre, or what I have called "informance design," provides a powerful tool for understanding the interaction infrastructures upon which new inventions are built. Along the way, I will also promote aging-in-place as a design space worthy of more attention.

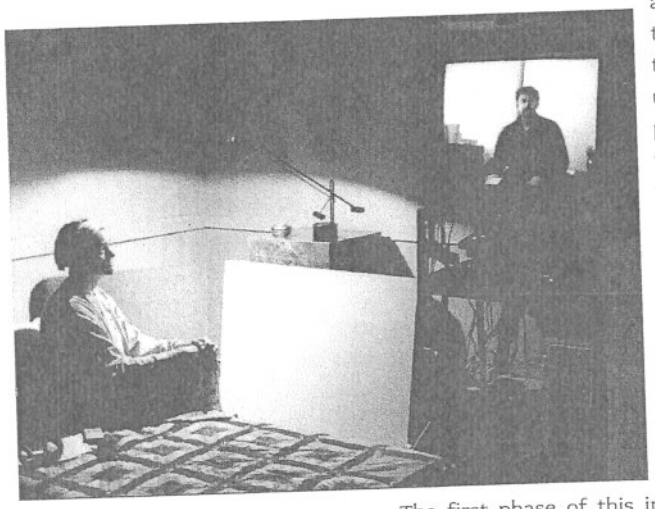
Case Study: The ElderSpace Project at Interval

> *Why are we working so hard to build a better nursing home? Why aren't we doing everything in our power to design technologies that help people grow old at home, instead of imprisoning them in institutions?* —"Bill," Senior Engineer at Interval Research, September 1993

Bill's provocative questions came as we were tearing down foam-core walls that we had constructed in three Interval conference rooms to simulate a more empowering, efficient nursing home of the future. Standing literally upon the rubble of the ideas that we had prototyped, I stared at Bill with dread and dismay. He was right: we had started with the wrong research question.

ElderSpace emerged from early Interval study of the residents and staff of a nursing home called "Live Oak". After weeks of analyzing video and photos from the facility, five of us—three social scientists, one artist, and an industrial designer—set out to produce what I called an "informance" or "informative performance" [Burns et al., 1994; Dishman, 2002]. Heeding Brenda Laurel's call to action in *Computers as Theatre*, we were ready to "improve the quality of human-computer experiences through new approaches to their design ... to create new visions of what people can do with computers" [Laurel 1991]. We were determined to move well beyond the personal computer, which was hardly "personal" or commonplace for anyone other than office workers in 1993. For that matter, it was also uncommon to imagine nurses (who today are still mostly women) and elderly residents (also mostly women) as the intended users.

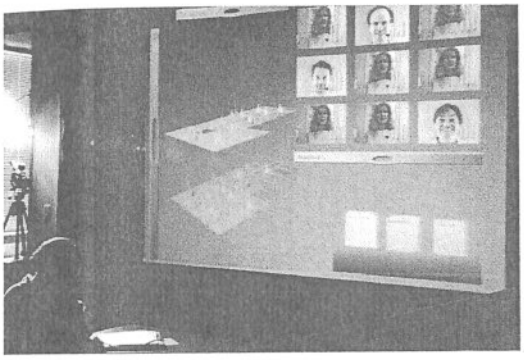
Humans are inadequate proxies even for people who are exactly like us. We are impoverished proxies for people who differ from us in so many ways. In ElderSpace, we were mostly in our 20s and 30s and, except for knowing our grandparents, were effectively clueless about the often invisible lives of elders and the staff who care for them. To explore these unknowns, each of us adopted a character—what have been called "personas"—based upon representative combinations of actual people we had studied. For two weeks, we tried to recreate for our own young, able bodies what some of the age-related effects of physical and cognitive impairment, loss of hearing and vision, and social isolation might be like. We brainstormed and built concept prototypes for our personas, using improvisation techniques and acted-out storyboards both to inspire and to constrain our ideas. Each designer-actor advocated for his or her persona and how each invention would fit or fail within the larger social system of a place like Live Oak.



"Susannah" (played by Karen Wieckert) and "Joe" (played by Colin Burns) use a video link between their resident rooms in Interval's ElderSpace infor mance in 1993. We combined cardboard props with working prototypes in a conference room to simulate this nursing home of the future. They used the video link to check in on each other several times a day.

The first phase of this informance was all about using theatrical techniques—using live bodies interacting in real space and real contexts with props to produce a plausible story—as part of the design process itself. We could have stopped with the rich portfolio of concepts we had produced—wireless ear buds, wearable microphones and medical sensors, object- and people- tracking systems, smart paper, and immersive video conferencing. But we decided that the best way to share our design ideas with our colleagues was to create a "Live Oak 2003" drama.

Why bother going through the trouble of scripting, memorizing, embodying and acting out the lives of these personas in a fully staged set? For us, the second phase of the informance was about iteration, instantiation, and integration.



Becky Fuson played the part of a nursing home administrator in Interval's 1993 ElderSpace project. We prototyped a wall-sized nurses station (designed by Colin Burns), which represented the location and health status of the residents and staff on a large graphical map of the imagined facility. The system was mostly imaginary, but showed enough of the concept to spark Interval engineers to start designing biosensors and location tracking technologies that might ease the administrative burdens of the many actual nursing home staff members we had studied.

What came to be known as "the show" gave us another chance to revise our concepts, forced us to move the ideas from paper to tangible prototypes, and challenged us to consider just how all of those technical and social systems might (or might not) work with one another.

With a mix of foam-core walls and computerized prototypes, we constructed three different environments for our five personas. "Joe" lived in a single-resident room with a video link to other residents. He was fairly mobile but had difficulty hearing. "Susannah," quite articulate and physically active, was virtually blind even with her glasses, while her more silent roommate, "Molly," was confined to her wheelchair with what may have been early-stage Alzheimer's. Each of them had a wall-sized screen interface of her own. The third room was the caregivers' station where a central communication system and wall-sized patient monitoring projection kept the staff—"Donny, Judy, and Becky"—quite busy with a range of triaged prompts to help them get through their day.

The show went something like this. With her wall-sized mural interface, Susannah "watched" soap operas recorded on her hard drive, made a Star Trek-style call to check on Joe, put in her eye-drops thanks to a whispered alert from an automated medicine tracker, and exercised with her friends online through an international "Seniornet." Molly was able to read an interactive *People Magazine* with video segments, to call for help at any moment, to have a hands-free conversation with the facility's chef, and to go on a virtual window-shopping trip at the mall with her grand-daughter. Joe played along with *Jeopardy* at his own pace, joined the video call with Susannah, and then showed off tagged paper photos of his old home which magically brought up digital versions on his wide screen. Donny, Becky, and Judy each attended to the residents' needs, constantly informed of emergency conditions by their wireless microphone/earbud system linked into the main computer and to each other.

We cast the fifty or so Interval audience members as themselves—as technology researchers studying a nursing home—so that they could ask questions about the technologies without breaking the continuity of the scenes. The informance lasted twenty minutes, but we ran it three times back-to-back so each audience member could see what was happening in the different rooms "simultaneously." Everyone attended all three versions, except for three people who later said the foam-core environment was "too real" and "too much like a nursing home" for them to deal with. Following the show, we tore down the set to launch a brainstorming session with all of the attendees about how to make some of those prototyped concepts into real technologies.

So did the ElderSpace informance work? We did not go into the elder facility business, but that was never our design goal. Several of the technology con-

cepts—especially around contextually-aware computing and tangible user interfaces—were taken on by other projects in the lab. The five designer-actors reported that they learned more by "doing" and "being" those characters than they could have by any other means. Most of the audience felt deeply engaged with the issues of social isolation, independence and health monitoring that we brought up. As a design process, most saw informance as having enormous power in two areas: 1. helping the designer to consider how each individual user is embedded in larger social systems; and 2. forcing us as technologists to evaluate the whole electronic ecosystem and interaction infrastructure when trying to bring in new technologies. And as I stood listening to Bill's questions amidst shredded pieces of foam core, disconnected computers and whiteboards filled with ideas from the Interval audience, I walked away with a new research question that did not stop haunting me.

Case Study: The Proactive Health Project at Intel

> *I pleaded with my children for years not to put me in an institution. Now that I am here, I wish I had come a decade ago. The hassle of taking care of my house is gone. The yard mowing is gone. The loneliness is gone. You ought to be convincing all those other 70-year olds to stop putting every penny into caring for their homes and to come to a place like this where the home cares for you!*—"Mark," Senior Citizen in Intel Research Study, March 2003

Questioning our questions is the most important thing we can do in any design research project. ElderSpace left me convinced that systems to support future elders should empower them to stay in their own homes. But Mark, a retired 79-year-old jewelry maker who lives in a high-rise retirement center, made me rethink that assumption during our recent Proactive Health studies at Intel. We do design research with real people for exactly this reason—to have our questions, ideas, prototypes and interfaces held up to the scrutiny of a diverse set of potential future customers so we can make better choices.

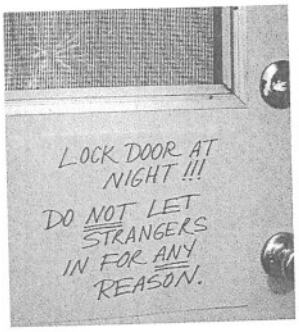
Thanks to Mark and many like him, we have come to understand that aging-in-place is really about giving people choice and that "home" must include all types of elder care facilities. Our recent focus groups with people in their 50s (future elders) and 70s (today's elders) revealed that we must also expand our definition of "healthcare." While these groups did ask for medical diagnostic devices and pill reminders, they also demanded tools for psychological support, promoting good fitness and nutrition, fending off social isolation, coping with loss of memory-hearing-sight and staying engaged in the world with a sense of purpose. These design themes echoed ElderSpace from ten years earlier. Bonnie Johnson, my mentor at Interval, always used to say: "Focus on peoples' enduring concerns."

BACKGROUND	EXPERT INTERVIEWS	2 dozen audio/video taped 1-2 hour interviews with Alzheimer's experts, cognition experts, geriatricians, home care nurses, etc.
	LITERATURE REVIEW	Hire consultants to review medical, popular and financial literature on cognitive decline; team to read top 3 works in each category
	WAKE-UP INTERVIEWS	Initial "pilot" phone and in-home interviews with elders and adult children dealing with cognitive decline; recruited by friend-of-friend
EXPLORATORY	CAMERA SURVEYS	Recruit 4 "segments" based on cognitive decline: send 24-roll disposable camera with 24 survey questions to about 100 households
	FOCUS GROUPS	Select "extremes" and "norms" to attend 12-person focus groups based on healthy aging, early stage decline, mid-stage and advanced
	CONTEXTUAL INTERVIEWS	Follow up in-home Interviews with 12 households for each segment: in-context discussions, show home and artifacts, videotaped
	SHADOW STUDIES	Choose 1-2 households from each segment for in-depth; we live with family for 1-3 days; observe with field notes and still photos
	LONGITUDINAL INTEVIEWS	Continue occasional follow-up contextual interviews with 2-3 households from each segment; note changes over time
	SURVEYS	Take key findings–such as day to day variability of cognitive disease–and survey larger numbers to see if it is broader discovery
CONCEPT	STORYBOARD SKETCHES	Cartoon-like drawings of future technologies used to help manage cognitive decline: shown to elders in interviews and focus groups
	INFORMANCE/FOCUS TROUPES	Invite key 2-3 households from each segment to theatrical show of key concepts/themes/prototypes for critique and brainstorming
	PROTOTYPE TRIALS	Deploy anything from "Wizard of Oz" to working prototypes of, for example, safety monitoring systems in 12-24 actual households

This represents the ideal model of methods and techniques used in Intel's year long Cognitive Decline study.

So how do we go about understanding these enduring concerns? Doing design research in a results-oriented, quarterly-driven company like Intel means we rarely have the resources to do full ethnographic, participant-observer field studies that sometimes last weeks, months, or years ▶30 PLOWMAN. I suspect the vast majority of so-called "corporate ethnographies" are similar to the structure we are using for our "Cognitive Decline" (CD) study. The table above shows an idealized, simplified model of our year-long CD study. Our funding and our findings will dictate how close we hold to this plan.

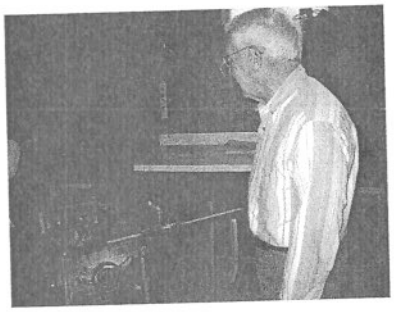
We are currently in the middle of the CD study. After background research that included expert interviews, literature review, and numerous in-home visits with friends who are experiencing cognitive decline as "patients" or "caregivers," we moved into the more formal, but still exploratory study of about 50 households. The crux of this phase has been exploratory focus groups followed by 3- to 5-hour contextual interviews (described below) that are videotaped and photographed with people interacting with their "stuff" in their homes, offices, cars or wherever appropriate. We have followed up with several households using two-day long "shadow studies" with more observation, less interview. These provide a deeper sense of daily routines but also day-to-day, weekend versus weekday, and seasonal differences that may be important.



In Intel's Cognitive Decline study, we conduct contextual interviews in the homes of Alzheimer's and other patients who are dealing with cognitive decline. We take hundreds of photos of these homes to help remind us of the challenges that our end users face. In this case, Bob's daughters have placed notes all around his house to try to help their Dad stay safe and independent. It is hard for him to remember who is a "stranger" and who is a friend or family member.

Contextual interviews—our primary tool of the trade—are essentially structured conversations whereby we use a list of about twenty themes (e.g., daily routine, privacy, technology usage, etc.) as suggested topics, but often the tour of a person's home will lead us into a "deep dive" on their key issues. In a recent visit to "Carl," an early-stage Alzheimer's patient in Rochester, New York, I spent an hour in his basement talking about his woodworking hobby. He used to have a "purpose jar" in which his friends and family placed requests for him to build toys, cabinets or fence posts. These days he has no sense of identity or usefulness because no one asks him to build anything for fear of him hurting himself on his electric saws. In every household, we now look for the metaphorical equivalent of a "purpose jar" and try to imagine how technologies might support such higher-level needs.

It is critical to understand both what people say ("I exercise for an hour every morning") and to observe what they do (he walks slowly around the basement for an hour while listening to music). For almost every story someone tells us or for every claim they make ("I can use the remote control just fine"), we, as researchers, are constantly asking, "Can you show me how you do that?" Sometimes it is a matter of understanding the specifics of what they are referring to. Other times it is a matter of their over-representing their abilities or being in denial about some issue, which becomes plain to see as they struggle with the remote control. Our goal is not to embarrass them or "call their bluff" but to listen intently between the lines of their words and actions for what they value, what they fear, what they hope for.



"Carl", one of the participants in Intel's Cognitive Decline study, shows me his wood shop and electric saws with great pride. These days he has very few projects to keep him busy and to give him a sense of purpose. His family and friends are frightened he may hurt himself on the tools in the basement; his wife often sits for hours just on the other side of the basement door so she can hear if things are okay.

When doing contextual interviews, we try to capture multiple and competing points of view. In the CD study, we tack back and forth between studies of boomers (the cohort) and today's elders (the lifestage) to get a sense of how boomers' expectations for aging mesh with the practical realities of people already experiencing aging challenges themselves. Furthermore, we interview and observe anyone who is relevant in the chain of care: the boomer or elder with decline, neighbors, friends, family members near and far, doctors and nurses, even their online support group. Every design research project must consider how the research participants are embedded in a larger social system and how to study the network of key players who inform the user's values, beliefs, actions, lack of action and stories.

We often hear very different versions of a story depending on who is present in the interview. With his wife sitting on the sofa next to him, a man with early-stage Alzheimer's recently proclaimed to me: "I'm doing fine—my memory is still good most of the time." Hours later, with just the two of us, he admitted "I'm having lots of trouble with my memory, but I can't let my wife know because it will just destroy her." Towards the end of the interview, his wife whispered to me: "He is too embarrassed to tell you the real problems he is having—he even

hides it from me because he is worried I will have his driver's license taken away or put him in a home." This kind of face-saving is not unique to the extreme circumstance of cognitive decline; I have heard similarly discrepant stories from different family members about everything from how they mange their calendar to deciding upon what car to buy to whether or not they watch television.

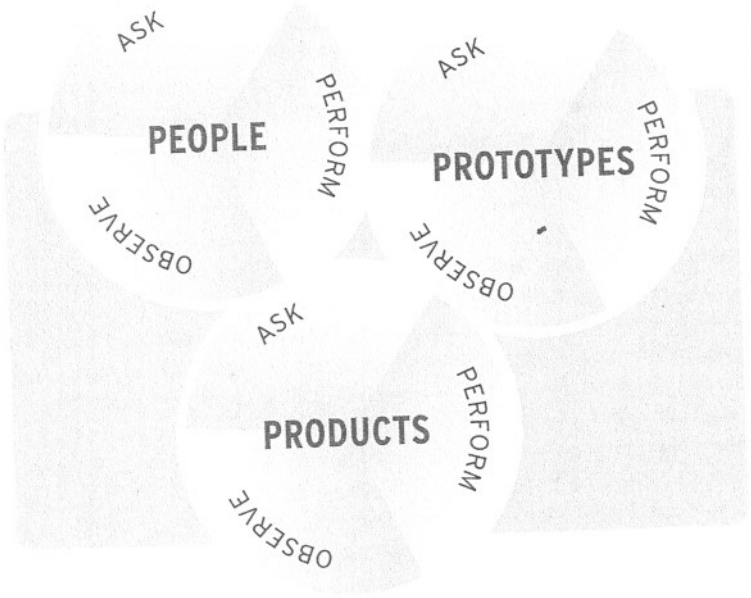
We are currently moving from exploratory research to concept feedback research to elicit input from boomers and elders on our early sketches, storyboards and prototypes. The biggest challenge here is helping them to imagine beyond their current concepts of aging, healthcare and technology. "Mary," a 78-year-old caregiver for her husband who has dementia, told us a year ago in response to our wireless safety monitoring concept: "There is no way I would let a system track our whereabouts and what we're doing. I don't want some strangers knowing everything about me and my family." Unfortunately, her husband has declined to the point where Mary has to sit with him twenty-four hours a day. When we arrived for our latest visit, she met us at the door: "Give me that wireless safety thing you showed me last time—I never imagined it would get this bad!"

We often find people unable to step out of their current experiences to be able to give a fully considered critique of an idea. They cannot conceive of new technologies much beyond their personal computers. They cannot understand privacy concerns beyond those they face already. If healthy, they cannot imagine the need for systems to help them get dressed in the morning or to make tea. This brings us full circle to the role of informance discussed in ElderSpace. We are in the midst of scripting "the next show," this time with caregivers and patients who are grappling with the nightmare of Alzheimer's. We will ask them to react to a future made real for them by actors with cardboard props and "Wizard of Oz" prototypes. And in the ways they so wonderfully always do, these future elders will force us to face the strengths and weaknesses of what we have imagined—and to rethink our research questions and assumptions again.

A Framework for Asking, Observing and Performing

> *We actually used some kind of video screen to watch each other open presents together at Christmas. I was in North Carolina, and Eric was all the way in Portland. Who would have ever imagined we could do such amazing things! I never thought it possible!*
> —"Jack," my grandfather, December 2001

Until time travel is perfected, we have no choice but to use every research method at our disposal to help us make an informed and empathetic guess, as best we can, about what needs, aspirations and values our future end users will have in the time when we believe our product will exist. Understanding future elders provides an extreme case of what designers must do all of the time: anticipate how some future group of people might discover, learn, buy, use and dispose of



The Ask, Observe, Perform framework is appropriate to use at all phases of design research, whether when just starting "exploratory" research to understand people, or getting user input on concept prototypes, or even testing/trialing nearly-finished products and marketing messages.

some product/creation we believe we invented for them. These two Interval and Intel case studies have touched upon a potentially confusing mish-mash of methods—expert interviews, focus groups, ethnographic field research, informance design, personas, storyboards and tons of iterative prototyping. A simple framework I use for almost any design project may help: "Asking, Observing, Performing."

Asking is about understanding the opinions, life stories, enduring concerns, everyday activities and core values of people, whether at the beginning of a project when defining the research questions or at the end when soliciting their feedback about a concept, interface or product. Observing real people in real contexts is a critical complement to asking, to help identify patterns and extremes of behavior, unarticulated needs, and places where peoples' actions and stories about what they do differ in important ways. Performing is about designers acting/testing out the future lives of their imagined end users, as well as getting those users themselves to embody and critique plausible future scenarios using concept, prototype and product level "props" to simulate future technologies.

As simple as the framework seems, Asking, Observing, Performing is never so neat and sequential in practice. Nor does it provide a cookie-cutter approach that works for everyone and everything. Literary scholar Terry Eagleton reminds us that "it is not a matter of starting from certain theoretical or methodological problems: it is a matter of starting from what we want to do, and then seeing which methods and theories will help us to achieve these ends" [210]. Design research methods are themselves "products" that need to be designed for different audiences, purposes and contexts—it really does all depend on what you want to do.

Through design research, I believe we have the capacity to imagine, invent and iterate our way out of a demographic/economic crisis that hopefully all of us will be able to look back on with a smile when we are in our 90s. On the way, we will have to ask different questions about what we mean by "home," "healthcare," "old" and "computer." And if we ask about, observe and perform the contexts of future elders, we may share in my grandfather's awe at the amazing things we have invented—at the products and services that we never thought possible.