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Remote Robotic Disability: Are We Ready for Robots?

Claudia B. Rebola, Rhode Island School of Design
Grace Eden, University of Applied Sciences of Western Switzerland, HES-SO Valais

Participation through a robot avatar has been described as a utopian future, but for people experiencing it in current social contexts it's a whole different reality. Last May, at the CHI 2016 conference at the convention center in San Jose, California, conference chairs made an effort to increase access: The chairs allowed for remote attendance using a commercially available telepresence product called Beams [1]. As part of the invitation to use the robots, participants agreed to take part in a user study with a researcher who studied their use at Ubicomp 2014 [2].

We are academics on separate continents, one in North America and one in Europe. We participated in CHI 2016 through telepresence robots, where we met each other for the first time in our robotic shells (Figure 1). We immediately began sharing our experiences about what it was like to move through the halls and conference rooms and how we attempted to display our intentions, requests, and interactional cues to the people around us. We were finding out first-hand how to establish what Janet Vertesi described as translation practices—developed by people who use remote robots to map the intentions and activities of human bodies into artificial bodies [3].

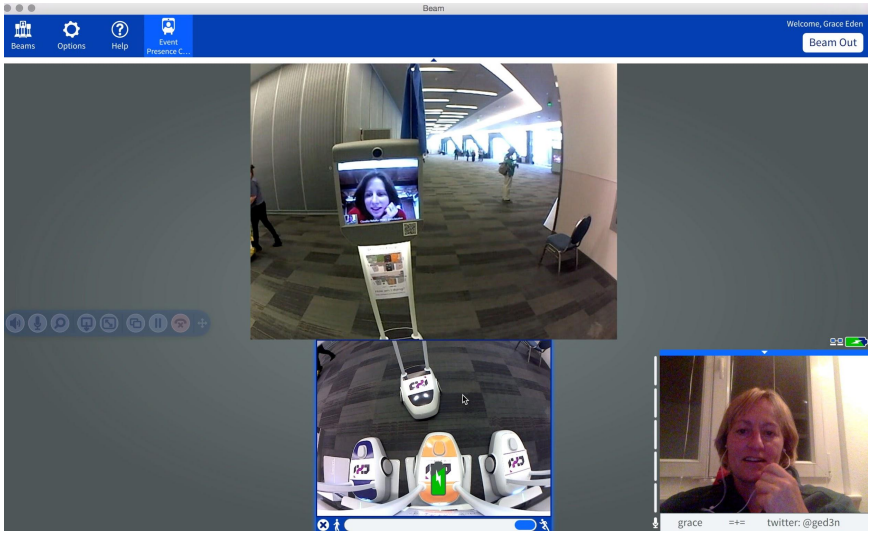

Figure 1. In the dock, waking up in our robot bodies.

While Vertesi's study focused on translation practices in a professional setting, she found that scientists who used remote robots over many years had simultaneously anthropomorphized

them and assumed their robotic characteristics. We, on the other hand, were embodying remote robots for very different purposes—personal and professional development—and for a very short period of time. Also, our goal was not to conduct highly skilled tasks through a robot in an unforgiving environment. Instead, we had a much more fluid goal: to attend and participate in an event with our colleagues and peers in the most naturalistic way possible. This meant *taking part* in the conference in the same or similar way in which we would have normally if we were there in our physical bodies. We wanted to attend plenary talks, special interest group workshops, paper sessions, coffee breaks, and lunches. We hoped to meet old friends and acquaintances, engage in small talk, and make new friends. Our goal was to be a part of the CHI 2016 conference's social milieu.

In our professional lives, we study the transformative effects of novel technologies on interaction. As we told each other our stories of improvisation and negotiation, from traveling ("walking") through the physical environment to engaging ("being") in a social setting, we realized we had an opportunity: Unlike in laboratory settings, we could share our experiences, successes, and challenges directly with the CHI community and ponder what might be next for social interaction through telepresence within large social contexts.

ROBOT POSSESSION

Stepping into the robot meant that we needed to learn to embody the machine by interacting with an interface. There are three displays used to navigate through space and to engage with people (Figure 2). At the lower left, we could see how our face was being transmitted on the large screen. At the bottom center was a view of the ground and the wheels; this feature was used to spot obstacles on our path, effectively serving as our feet. The largest screen displayed an eye-level view. Both the ground and eye-level views gave us a sense of where we were standing. The screen on the lower right displayed our faces that people could see on the monitor of the Beam. The robots rotated 360 degrees, which allowed us to see what was going on around us by turning our heads using our robot torso. We controlled motion (back, forward, left, right) with the keyboard's arrow keys. Holding down the shift key increased our walking speed—we could even "run," but not as fast as humans.

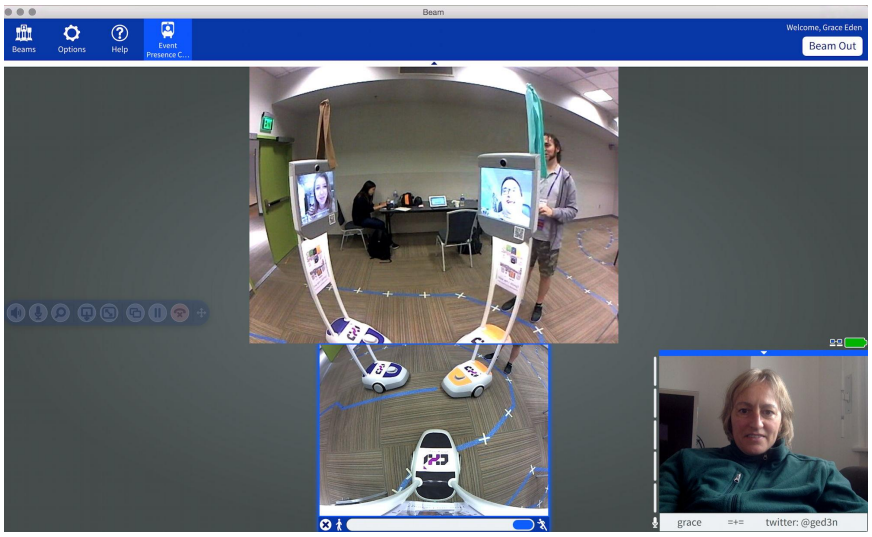

Figure 2. The interface and the training room.

Robot personalization and possession was encouraged, so we added our names, Twitter handles, email addresses, and affiliations to the screen; we even used it to display how we were feeling. People would identify us by the physical attributes of the robot, in this case, limited to the color of the flag perched on top of us.

In addition, we had a live Skype text chat open where we could talk to telepresence coordinators about technical problems such as audio or video not working, or losing our connections due to networking issues. A request would go something like this: *I'm the beam with the orange flag. Could someone come help me find a docking station? I have a low battery*.

Remote impairment. On the first day, when we turned on the machine it was like *waking up*. All of a sudden, we were in this new place, like entering a dream. It felt like a "hello, world" moment. We looked around and immediately found ourselves in a conversation with a curious person. As we took our steps out of the docking station, we were completely disoriented. It was tough to acquire a sense of physical location in the building; we were always lost. We had PDF maps, but reading a map and navigating the space were two very different experiences. We missed our smartphones, or at least the Google Maps app that would have helped us navigate the venue.

As we made our way through the conference venue, people were very curious, waving and saying hello; some would come over to talk. The robot was familiar to most. We looked like a person via the screen interface—our identity had been mostly transferred to the plastic wheel machine. Yet, we were *strange and unusual*, causing people to stop and engage. Often, we would be walking and people would take pictures and shoot video as we passed, usually without permission. All of a sudden we felt like celebrities. We got much more attention than we would have if we had attended in person.

However, the strange and unusual quickly turned into us being *different*. Our intention with the robots was to have them be collocated versions of ourselves, but we realized that most of our encounters were “unexpected interactions” with our robot selves, framed mostly within a feeling of being *disabled by technology*. Our robotic embodiment altered our physical mobility, hearing abilities, verbal deliveries, and visual fluidity and accuracy. For example, we were loud and awkward; we could not see well; and we were often in people’s way with our slow reactions.

As we became more familiar with the routines of embodying a robot, on the second day, we realized that our focus on remote engagement had put our actual bodies in a kind of stasis: We had become couch potatoes. We prepared for a marathon session in front of the computer screen. With an area reserved on the table for coffee and some food to graze on while reclining on the sofa, it reminded us of the times we have prepared for binge-watching. We tuned out of our surroundings and “turned on and jacked into” San Jose.

The audio and video quality of the remote robots was quite low and required that we zoom into the slides during presentations, so we lost a sense of visual presence and of *being in* the room, making us feel as if we were just watching a webcast. We noticed that people could not see us clap at the end of a presentation, so we clapped visually, displaying our clapping hands in front of the video screen. As a session continued on to the third presentation, it was impossible to make eye contact and smile at other audience members during Q&A segments. The experience became increasingly isolating, as we did not *truly* feel embodied at a remote location. As someone with family members with disabilities, we compare it with our ideas of what it might feel like to be autistic—we experience the world, but we cannot communicate those experiences or connect fully with others (Figure 3). It became difficult for people to interpret our behaviors. Many did not want to engage with us simply because our personalities were encased in a robot.

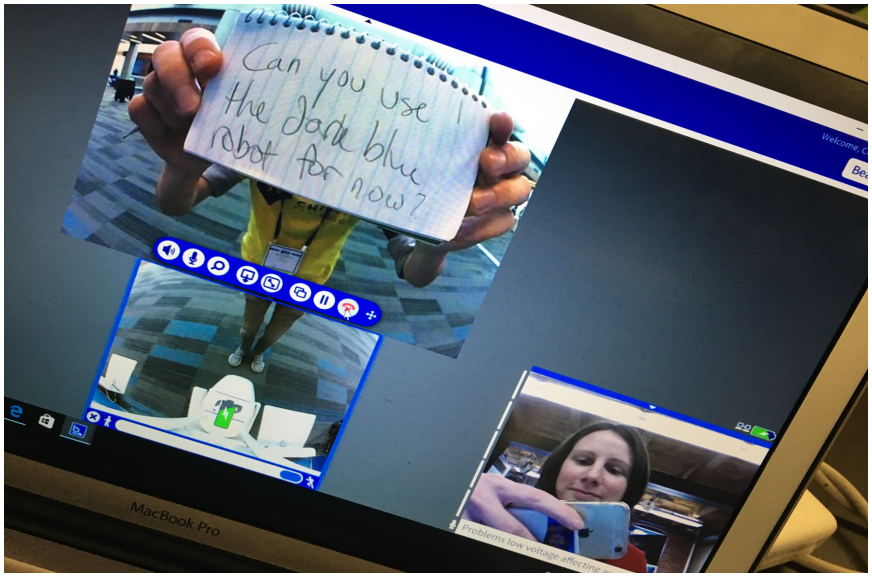

Figure 3. Ways of initiating communication and connection.

That said, we were able to *do* most of what we intended. However, we often needed help moving around, especially in elevators. We would ask a CHI helper and, in turn, helpers would ask “Can I touch you?” or say “I will move you.” Their polite behavior of asking before doing something with us, the robots, disappeared when we were *passing out,* something that happens when a robot loses its network connection. The video screen that displays a person’s face freezes and changes from color to gray, as if they have been frozen in time. It can happen anytime but is guaranteed to occur when entering an elevator. When we passed out, as in the real world, we relied on the goodness of strangers to take care of us. For us that meant being pushed out of the elevator so we could reconnect to the network, something we associated with catching our breath after a blackout. Although we knew about this issue, taking an elevator felt strange and surreal. We would wake up in a different place (away from the elevator) feeling disturbed and disoriented, asking ourselves questions such as “Where am I?” “How did this happen?” “What happened to me?” and “Who did this to me?”

Overall, we did not feel ignored. Rather, we felt supported with the special treatment and care we received. However, as we spent more time in our robot shells, we started to feel we had acquired some strange new disability. Did others also perceive us as disabled? In addition, we experienced a darker side to being different: In addition to curiosity, we also experienced hostility.

Social sensitivities. Our remote robot disability affected our ability to engage with others socially and in many instances challenged us as we tried to participate with our CHI colleagues. Simply taking a seat at a plenary session was not as simple as it sounds; we had to be guided by helpers. We then realized that eavesdropping was at times almost inevitable because people did not think of the remote robot as a person. This experience was interesting at first, but soon we felt like we were being ignored. There was no ability for us to display quick side-glances or smiles of recognition to make connections with people as we waited for the speakers to begin. During a break session, we decided to sit in a chair in the hallway, virtually of course. We did this by standing in front of a chair. Our hope was to begin a conversation with the person sitting next to us or to have someone sit next to us on the other side and try to engage in small talk; however, we were ignored. We found it difficult to initiate the conversation, maybe with a question such as “Do you have a pen I could borrow?”—hmmm, no, that wouldn’t work. Our confidence faded as we felt increasingly isolated and a little too special; we would be rejected because, encased in these machines, we were too “different.”

Another significant experience was our perceptions in public spaces. Our way of talking and moving may have led people to discriminate against us. In one instance, as one of us attended a session, the speaker recognized “me.” My colleague got closer, and with some embarrassment said, “You know that you are really loud?” From that moment, our embodiment changed to self-awareness, modifying our identity. People were also afraid we could hurt them, as they perceived us as unstable and unreliable; indeed, we were a little bit sloppy, unintentionally rude, aggressive, bumpy, and rough with our movements. For many, our

presence was disruptive—sitting (parking) in the wrong places; blocking or interfering the view to others; walking in places we shouldn't; stopping all of a sudden in high-traffic areas; traveling at speeds different from those of the audience; bumping into people who were distracted (i.e., on their phones). We lacked "robotic social skills," because we did not know how to maneuver and behave with our limited abilities in the social setting (Figure 4).

Figure 4. Lacking robotic social skills.

As these mishaps between the robots and people occurred consistently over time, there were reports that people were "pranking" the robots, as we were informed in our Skype chat: *All: please let us know if you are pranked at all. There have been some people putting their foot on the beams so the driver cannot drive. If this problem recurs, we can take steps to deal with it* [4]. One of us went to the diversity lunch in the hopes of discussing feelings of being different and to be a representative of robot diversity. However, during the discussion everyone ignored the robot avatar, and we were not included in the conversation—so much for inclusion and diversity! We felt disheartened. The astonishing moment was that during a SIG session, two people got aggressive and said they should switch the robot off. Then they started to kick my feet. Was this technophobia? What was causing these reactions? Is it simply straightforward prejudice?

WE ARE ROBOTS!

We decided to reclaim our feelings of being valued despite the physical and social liabilities that presented themselves when we were encased in our robot avatars. We ran down the halls singing together and "danced" to try to shrug off some of the restrictions of being inside the machine. We were sick of feeling different, a thorn in someone's side. While blaring a good beat from one of the robots, we jerked the controls back and forth, moved from side-to-side, and

turned in circles. After some initial embarrassment, some CHI volunteers even joined us in our merrymaking and we even wore hats and accessories for fun (Figure 5).

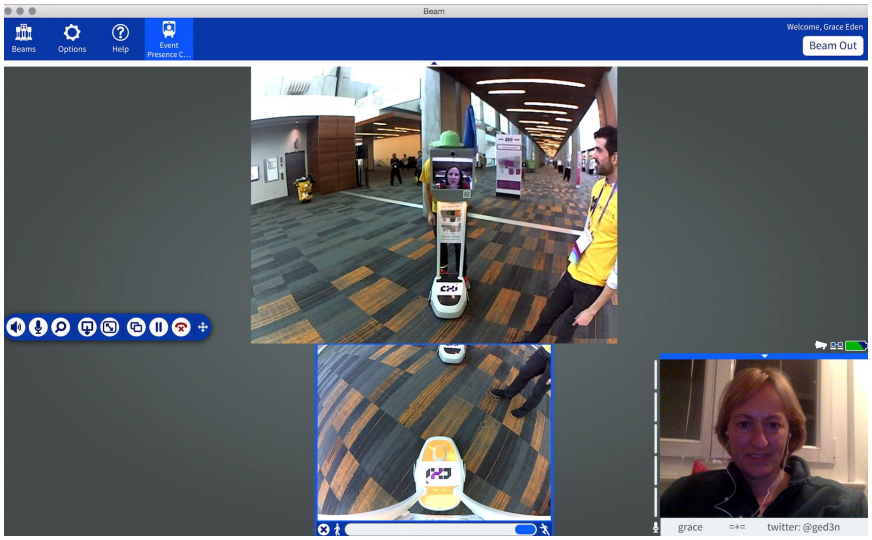

Figure 5. Celebrating our robot selves.

The experience of letting go was liberating for us. We felt so bogged down by our limitations: always relying on others to open doors or take us in and out of the elevator, being ignored or harassed by fellow conference-goers. Even though many people were kind to us, incidents of isolation and even discrimination were prominent, simply because we were using a remote robot. This weighed on us. When all is said and done, we felt very fortunate to have had the opportunity to engage in such a large social context like CHI 2016 through telepresence robots. However, we cannot help but wonder what might be next for social interaction through telepresence within large social contexts. The experience made us realize we have a new kind of human disability—let's call it Remote Robotic Disability (RRD). Are we ready for robots?

Endnotes

1. Suitable Technologies Beam Smart Presence System. From: https://suitabletech.com

2. Neustaedter, C., Venolia, G., Procyk, J., and Hawkins. To Beam or not to Beam: A study of remote telepresence attendance at an academic conference. *Proc. ACM Conference on Computer Supported Cooperative Work*. ACM, New York, 2016, 418–431; DOI: 0.1145/2818048.2819922

3. Vertesi, J., "Seeing like a rover": Embodied experience on the mars exploration rover mission. *Proc. CHI '08 Extended Abstracts*. ACM, New York, 2008, 2523–2532; DOI: 10.1145/1358628.1358709

4. CHI 2016 Telepresence Chairs. CHI 2016 Beam Discussion Skype Chat. 10 May 2016.

Claudia B. Rebola is an associate professor in ID at RISD, formerly at Georgia Tech. Her work brings together design, science, and technology to experiment and prototype innovative interactive products for health, disability, and aging. She recently published her book *Designed Technologies for Healthy Aging* with Morgan and Claypool. crebola@risd.edu

Grace Eden explores the effects of ICTs on human behavior and social interaction using qualitative fieldwork, naturalistic experiments, and video ethnography. Her focus is on understanding communication, collaboration, and knowledge exchange within a variety of professional disciplines and domestic settings. She also works with participatory design techniques to facilitate stakeholder engagement in technological innovation.
grace.eden@hevs.ch

Insights

- Participation through a robot avatar can be challenging using telepresence robots
- There are limitations to how people can interact and behave through robots
- With the increased use of robot avatars we identify the emergence of a new kind of human disability (Remote Robotic Disability - RRD)