Use of "Smart Home" Technologies by Individuals with Disabilities: Findings from Qualitative Research

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About the Wireless RERC

- **Mission**: To integrate **established wireless technologies** with **emerging wirelessly connected devices and services** to promote a **transformative future** where **individuals with disabilities** achieve **independence, improved quality of life**, and **enhanced community participation**.

Social and Cultural Design Research

- Focus groups on next-generation wireless devices
  - 11 focus groups from November 2017 to June 2018; 41 participants with disabilities
  - 4 local partners: Center for the Visually Impaired (CVI), Georgia Centers for the Deaf and Hard of Hearing (GCDHH), Tools for Life (Georgia's AT Act Project), Shepherd Center

- Foundational Research for IoT Design Factors
  - Accessibility and Usability: Barriers and Facilitators
  - Social Acceptability and Cultural Appropriateness: User Expectations
  - Adoption and Use vs. Rejection and Abandonment

Opportunities and Facilitators

- Voice control: Accessible input for range of disabilities
  - "Being able to have voice activated commands for home automation is finally what got me to say 'OK, let's make that leap and give this thing a try.'"
- Intelligent assistants: Information and environmental control
  - "I'm a quad, and I have no hands already…and being able to operate all these different things with one home automation system…adding voice to it…that added another level."
- Relative affordability, especially compared to legacy home automation
- Integration with smartphone technologies: Apps for many devices

Barriers and Limitations

- Device Setup: Greatest accessibility challenge
  - "Companies…try to accommodate people with disabilities. But you still have to have somebody sighted set it up."
  - "Of course I couldn't see the orange ring and so I would just keep pressing. I didn't know which buttons to press…I just had to keep pressing the button…I would wait 5-10 minutes."
- Cognitive Load
  - "I have 47 skills…the more skills you add, the more it is to remember…I stopped at that point because I was getting confused."
- Customizability for Individual Needs
  - "The problem with this [smart thermostat] are…the settings, there's a 6 degree temperature difference that I couldn't change…which for cervical injuries is very big."

Other Design Considerations

- Speed of Technology Development
  - Technology evolves faster than research projects
- Misperceptions about what devices can and can't do
  - Devices may be accessible or usable, but users may not be aware
- Open and Unfixed Design of IoT: Opportunities to Design for Disability
  - Involve people with disabilities in design and development at the beginning
- Concerns about Technology Dependence, Privacy, and Security
  - "Frankly the whole thing kind of freaks me out…I don't mean in a conspiracy theory way…but privacy…[and] when we give it all to these devices that do it for us, well then we'll be weaker than we used to be."

Want to Learn More?

Please visit [Wireless RERC (http://www.wirelessrerc.org)](http://www.wirelessrerc.org) or
Contact nathan.moon@gatech.edu

- Wireless RERC Research Brief: "Accessibility, Usability, and Social and Cultural Acceptance of Next-Generation Wireless Devices"
  - [Research Brief (http://bit.ly/wRERCBriefSmartDevices)](http://bit.ly/wRERCBriefSmartDevices)
- Survey of User Needs (SUN) and SUNspots
  - [SUNspot 1 (http://bit.ly/wRERCSUNspot1)](http://bit.ly/wRERCSUNspot1)
  - [SUNspot 2 (http://bit.ly/wRERCSUNspot2)](http://bit.ly/wRERCSUNspot2)
- Upcoming Wireless RERC Videos on our You Tube channel for Amazon Echo
  1. "Out of the Box and Onto the Table"
  2. "Location and Operation of Buttons"
  3. "Syncing the Echo to the Alexa App"