Facilitating discussion and shared meaning: Rethinking co-design sessions with people with vision impairments

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ABSTRACT

This workshop paper describes experiences conducting two co-design sessions with 15 people with vision impairments. Reflection includes a discussion on the challenges around doing voice-based and tactile co-design with people who are blind or low vision including artifact creation and forming shared representations. This reflection is followed by a critical discussion of ideas for other researchers doing co-design with people with vision impairments and how they can model methods to better facilitate shared meaning among design group participants.

CCS CONCEPTS

Human-centered computing → Accessibility design and evaluation methods

KEYWORDS

Co-design, accessibility, multimodal, blind, vision impairment

INTRODUCTION

Co-design with people with disabilities is important for designing systems that they perceive to be useful and usable. However, doing this in practice remains challenging. Prior work has shown how participatory and co- design can often exclude the target user, be comprised of unintentionally exclusionary elicitation and ideation techniques, and often results in data with low sample sizes. In this paper, I discuss a case study of two co-design sessions with people with vision impairments designed to be more inclusive than co-design techniques created for solely for sighted people. These design sessions were in the context of creating accessible transportation systems for people who are blind or low vision and incorporated voice-based and tangible interface design components. From this work, I reflect on challenges of the artifact creation process and facilitating shared representations with the group. This work provides a lens on what co-design can look like for populations where traditional design methods may be inappropriate.

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Challenges of Co-Design with People with Disabilities

A major challenge with doing co-design with people with disabilities is not eliciting feedback and involving the target population. Much research has studied how to engage people with dementia in participatory design activities. Research continues to show that involving people with dementia often leads to participatory design with stakeholders such as caregivers, rather than people with dementia themselves, because severe disability may negatively impact ability for researchers to interpret how people with dementia communicate [2]. Similar proxy concerns have been raised with co-design with children with disabilities, people with autism, and people with aphasia [2,3]. While caregivers and have direct experience and often long-term relationships with the target population, critics argue their feedback should supplement rather than replace the opinions of people with disabilities.

Prior work has also shown how communication, discussion, and artifact making can be challenges in co-design and ideation with other groups, particularly people with vision impairments [1]. Many co-design sessions involve making some tangible artifact, but how to effectively use build artifacts when co-designing with blind people has yet to be determined. Some research suggests blind people may be intimidated by or unable to engage co-design techniques with high levels of tactile representation because of lack of

shared representation, meaning participants are unable to visualize in real time what artifact is being created by a group member [5,6]. On the other hand, research has described how tactile artifacts encourage discussion. Collaging, foam modeling, card responses, verbal feedback, and storytelling [4] have been proposed as approaches to gather feedback about a product from people with vision impairments. But, these sessions involve individual participants creating their own designs rather than collaboratively designing solutions.

In addition, we know that discussion dominates over design in ideation sessions with people with vision impairments. Williams et al.'s findings [6] show how blind participants prefer to discuss ideas rather than build low-fidelity prototypes. These findings and others suggest scenario-based instructions, training on how to use the materials, and working in small teams can facilitate more hands-on engagement [1,5,6].

Overall, soliciting design input from people with vision impairments mostly relies on verbal feedback, limiting the ways in which people with vision impairments can contribute to the design process. There remain challenges in getting people with vision impairments to engage in non-visual participatory design. The remainder of this paper reflects on two forms of co-design with people with vision impairments:

Co-design technique #1: A scenario-based voice role-playing session, carefully crafted to foster discussion

Co-design technique #2: A scenario-based tactile artifact building session, designed to increase shared identity among blind participants

Context

These two design techniques were implemented in the context of design focus groups with visually impaired people. These focus groups were intended to solicit feedback on how to design accessible autonomous transportation systems for people who are blind or low vision.

METHODS

I conducted four design sessions in two focus groups for people with vision impairments, where each focus group had one voice-based co-design session and one tactile co-design session. Fifteen people participated across the two focus groups (group one, n=4; group two, n=11). Since these groups had different sizes, group two was further split into two smaller groups for more effective ideation (group two-A, n=6, group two-B, n=5). These participants were recruited through one local agency and one national agency for the blind in Michigan. Each person was compensated $20 in cash for participating.

In the two voice design sessions, participants were instructed to work together to brainstorm how an autonomous vehicle could address the safety concerns of a driver (group one) or help a blind person navigate obstacles during a driver transition scenario (group two). Prior work shows how scenario-based approaches can be useful for conducting participatory design people with vision impairments [5,6]. Both groups were given 10 minutes to brainstorm solutions and told they would need to act out a scenario presenting their solution where one participant in the group was to act as the driver of the car, and the other person to act as the voice- or audio-based system in the car. Since they would have to present their ideas as a group, the goal of this activity was to encourage discussion among participants.

In the two tactile design sessions, participants were asked to work together to brainstorm something they could touch or feel to help a blind driver understand their car's location relative to other vehicles in the driving environment (groups one and two). Similarly, participants had 10 minutes to complete this task. To facilitate shared meaning making and discussion, a researcher placed the artifact of whoever was presenting their idea on a corkboard and passed it around to other participants.

In the remainder of the paper, I present a critical analysis of the two transcribed sessions, comparing what groups of participants did during the sessions to the intended goal of the voice and tactile design exercises, and to previous work on co-design and participatory design with people with vision impairments.

REFLECTION

Voice-based co-design exercise

Three groups participated in the voice interface design exercise across the two design sessions (G1, G2a, G2b). The intent was for participants in each group to brainstorm a solution to the problem and engage in a role-playing exercise. However, I observed difficulty creating the artifact and key differences in the artifacts produced.

Similar to prior work, participants in each group spent a lot of time on discussion and all groups had to be reminded of needing to focus discussion for the purposes of presenting. I reminded G1 after 4 minutes, and G2a and G2b approximately 8 minutes into solution brainstorming, after which each group was ready to present their solution within two minutes. From observing this process, I noticed dominant group members made the decisions for the group without incorporating opinions from others. Further, actors improvised the delivery of the voice solution. Because of this, I asked for everyone's feedback after the voice exercise.

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This was helpful in getting opinions of people who weren't acting and learning about attitudes towards the proposed solution.

Further, the artifacts (voice solutions) produced by the groups varied in type. Group one chose a conversational approach to delivering their solution:

P3/driver: …Put the key in the ignition. Turn it, now everything is starting to talk.
P2/vehicle: Ok. Where are we going?
P3/driver: Ok I'll punch in 1503 Drive Lane. That's a friend's address.
P2/vehicle: Ok Mr. [P3], we're going to that address you mentioned and we're on our way.
P3/driver: How is the traffic going to the house?
P2/vehicle: Ok JF, everything is clear. We're riding smooth.
P3/driver: Alright. Seatbelt is on. Everything is good. We're driving down the road.
P2/vehicle: Right. What's your destination? It's that address?

This excerpt is from a transcript of the conversation between P3 who is acting as the driver and P2 who is acting as the autonomous vehicle. Although not instructed to do so, it shows how the driver actor employed a think-aloud process, describing how he would interact with the autonomous vehicle and how he would talk to the vehicle. This joint thought process can be helpful to the researcher for learning about the state of the role-playing environment, and what the actors perceive to be important about their environment.

Group G2a used a narrator-based approach to describe their solution. G2a had one person in the group acting as a driver, one as the vehicle, and one acting as the narrator:

P10/driver: Come on my GPS. I'll drive.
P5/narrator: Okay, here's the instruction, the problem. We're proceeding down [street name] and we come across this object that we have to deal with and the object is called the
P7/vehicle: Roundabout
P5/narrator: Roundabout. Okay so there are no stop signs. We're driving a fully automated car, right? Okay there's no stop signs. There's no lights so you and there's 2 lanes that you turn into so we're going to depend upon the
P7/vehicle: Vehicle GPS
P5/narrator: That tell us which lane we're supposed to enter and the car will automatically do that. Right driver?
P10/driver: Yup

This transcription shows how P5 served as the narrator describing what is happening in the environment. But, this did not allow the driver and vehicle actors to contribute meaningful content to the conversation. Although having two actors means other members of the group are unable to interact when presenting the activity, it is important for facilitating an active role-playing scenario. If the goal is for all group members to present, each of them need to have a specific role or perspective to speak from.

Group G2b did not use a narrator or conversational approach, rather described their scenario:

P14: One of the things we discussed is if a pedestrian walks up and down the street and one of the things we were working out is how the vehicle responds to it. So from an audio standpoint, one of the things we discussed was directional audio beeps or clicks so if you were like approaching a pedestrian because people don't often just walk straight down the middle of the street… The direction they move, you will get a beep or a click in that direction so for example if they started off by some chance directly in front of the car, it'll beep directly pretty much heads up twelve o'clock

This shows that P14, one of the two dominant group members in G2b, described the solution in total. After presenting the idea and asking for feedback, the group seemed to agree. However, this presentation did not engage any other group members, and therefore is less clear if this is solely his idea or the idea of multiple group members. If possible, the facilitator in a voice elicitation co-design exercise should require engaging at least two group members to reflect the opinions of more than one group member.

Tactile co-design exercise

The tactile co-design exercise engaged each person in the design process but also presented challenges with lack of shared representation and preference towards ownership.

As suggested in prior work [6], I described each of the design materials available on the table in detail and their placement. Participants had access to popsicle sticks, cork stoppers, clay, rubber bands, cotton balls, and pipe cleaners. One advantage to this overview is that participants who weren't describing their ideas to their group members still engaged with the materials and tried to build something.

A major challenge of tangible co-design sessions with people who are blind is the difficulty of iterating on a group member's visual design idea. To mitigate this concern, participants were instructed to describe their solution aloud during the building phase, and encouraged to pass their prototype around to others using a central corkboard surface.

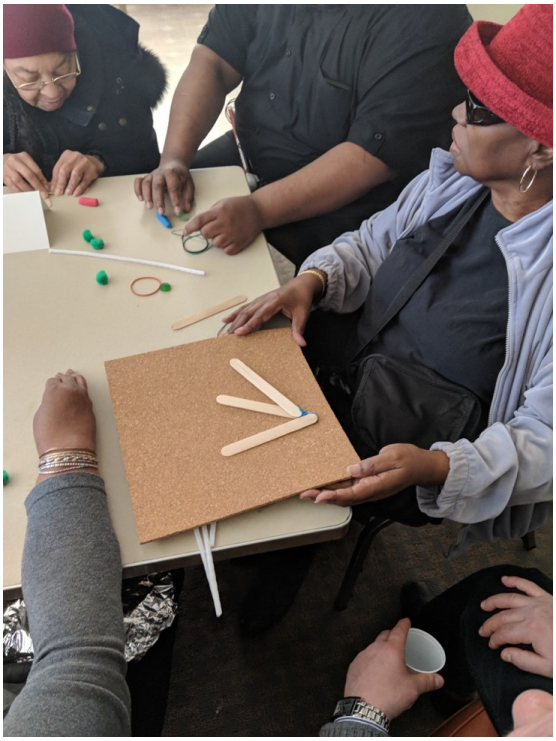

Figure 1. Corkboard where people can share their prototypes with other group members

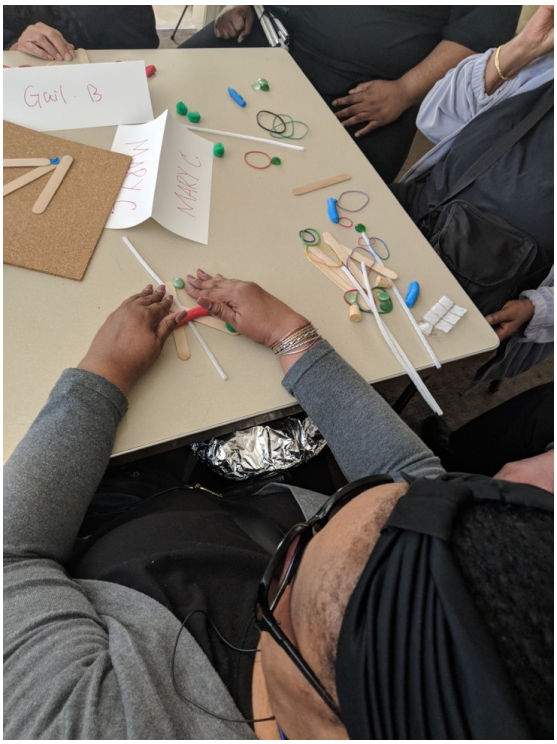

Figure 2. Participant creating own prototype without corkboard

Figure 1 shows one prototype being shared with other members of the group. However, this sharing only took place after a participant completed their design, resulting in a limited shared representation experience.

While myself and graduate research assistants verbally described the process of the prototypes being built for other group members, this lack of shared representation during the design process also led to an ownership of a design, instead of it being a group-designed artifact. Figure 2 shows how a participant decided to create her own solution after touching the solution already placed on the corkboard.

Future co-design sessions may experiment with intentional and required 'breakpoints' where participants are required to share their designs prior to being completed, similar to 'show and tell' brainstorming techniques [4]. Iterative sharing may facilitate the 'creator' being more willing to continuously describe and state the meaning behind their prototypes, while also allowing creative freedom from other group participants. It may also help for only one participant to have access to the materials at a time and encourage a 'round robin' iterative development cycle where participants take turns adding one thing to the prototype at a time.

TAKEAWAYS AND OPEN QUESTIONS

A critical reflection of these two co-design workshops with people with vision impairments shows some successes but also areas for improvement in the future to ensure ideas are heard and are a representative of the groups' opinions. For voice-based co-design, a scenario approach worked well as other research suggested, but this paper suggests the importance of assigning people to different roles when presenting their idea. Challenges remain in facilitating a shared group representation of a tangible design. But, constructing a more intentional co-iterative design process could help. Open questions include: 1) how to balance too few roles with the potential of too many roles in sharing co-design ideas and 2) how to produce shared representation opportunities without diminishing the contributions of a sole contributor?

REFERENCES

1. Cynthia L. Bennett, Kristen Shinohara, Brianna Blaser, Andrew Davidson, and Kat M. Steele. 2016. Using a Design Workshop To Explore Accessible Ideation. In *Proceedings of the 18th International ACM SIGACCESS Conference on Computers and Accessibility - ASSETS '16*, 303–304. https://doi.org/10.1145/2982142.2982209

…

2. Jordan L. Boyd-Graber, Sonya S. Nikolova, Karyn A. Moffatt, Kenrick C. Kin, Joshua Y. Lee, Lester W. Mackey, Marilyn M. Tremaine, and Maria M. Klawe. 2006. Participatory design with proxies. In *Proceedings of the SIGCHI conference on Human Factors in computing systems - CHI '06*, 151. https://doi.org/10.1145/1124772.1124797

3. Henrik Svarrer Larsen and Per-Olof Hedvall. 2012. Ideation and ability. In *Proceedings of the 12th Participatory Design Conference on Exploratory Papers Workshop Descriptions Industry Cases - Volume 2 - PDC '12*, 37. https://doi.org/10.1145/2348144.2348157

4. Cecily Morrison, Edward Cutrell, Anupama Dhareshwar, Kevin Doherty, Anja Thieme, and Alex Taylor. 2017. Imagining Artificial Intelligence Applications with People with Visual Disabilities using Tactile Ideation. In *Proceedings of the 19th International ACM SIGACCESS Conference on Computers and Accessibility - ASSETS '17*, 81–90. https://doi.org/10.1145/3132525.3132530

5. Nuzhah Gooda Sahib, Tony Stockman, Anastasios Tombros, and Oussama Metatla. 2013. Participatory design with blind users: A scenario-based approach. In *IFIP Conference on Human-Computer Interaction*, 685–701. https://doi.org/10.1007/978-3-642-40483-2_48

6. M. A. Williams, E. Buehler, A. Hurst, and S. K. Kane. 2015. What not to wearable: using participatory workshops to explore wearable device form factors for blind users. In *W4A '15 Proceedings of the 12th Web for All Conference*, Article No. 31. https://doi.org/10.1145/2745555.2746664