

# Early Indicators of the Effect of the Global Shift to Remote Work on People with Disabilities

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## ABSTRACT

Interviews of 25 people with disabilities who telework that were conducted during the first month of the COVID-19 pandemic response in the U.S. provided an early indicator of how they were affected by the abrupt shift to remote work. The participants included people with a range of disabilities that regularly teleworked before the pandemic. The interviews identified how having everyone work remotely leveled the playing field in some ways, for example, by giving everyone the remote work experience, making social activities more explicit and inclusive, and affording a frontal video view of every participant, making it easier to lip read. The comments also identified ways that the workplace could be more inclusive by further embracing telework, even after the pandemic response. While people with disabilities may have embraced teleworking to make their work more accessible, their experiences can help identify design implications for making a future remote work experience more inclusive.

## CCS CONCEPTS

• Human-centered computing • Accessibility • Empirical studies in accessibility

## KEYWORDS

Accessibility, telework, computer-mediated communication, collaboration technology.

## 1 Telework for People with Disabilities

Telework has often been promoted as a way to include people with disabilities into the workforce. Prior studies [10] have documented the higher rates of un- and under-employment of people with disabilities and documented encouraging ways that teleworking can help overcome some of the barriers to inclusive employment. Working from home avoids the hassle of commuting, which can be a hardship for people with certain disabilities. It also affords setting up a work environment that is tailored to the person's abilities without the risk of being disturbed in a semi-public office setting. Working from home offers more control over the work environment, which can be especially important for people who are neurodiverse. And working from home offers more scheduling flexibility and proximity to support resources, which can be important in maintaining the well-being of people with disabilities. This combination of factors makes teleworking a valuable way of making work accessible to a wide range of user abilities.

While doing a study to understand the *lived experience* of people with disabilities who telework, the COVID-19 pandemic outbreak forced most people to abruptly shift to teleworking. Participants were being interviewed during the first month of the pandemic response in the U.S. during March and April of 2020. This timing provided an opportunity to explore how the sudden shift of everyone teleworking affected their telework experience. Since the study was focusing on people who were already regularly teleworking before the pandemic response, it does not provide any insight on how people with disabilities coped with abruptly changing to telework (a valuable study for future research). Furthermore, while these observations represent early reactions during the first month of the pandemic response, more research would be needed to see how those reactions evolved over the ensuing months of the pandemic response.

Participants reported some ways in which having everyone teleworking leveled the playing field in their work experience. But they also identified some new tensions and accessibility issues experienced during the

pandemic response. This study points out how studying “extreme users” of people with disabilities identified opportunities for making telework a better experience for all of us.

## 2 Related Research

Telework and remote collaboration has been broadly studied in the CSCW literature (e.g., [8; 3]). A special issue on telework and people with disabilities in the journal *Work* [6] illustrated a high overlap with known issues of teleworking in general regarding work/life balance and feelings of social isolation. While telework has many implications for the general population, this study, and review of related research, focuses on the intersection of telework and people with disability.

Even while teleworking technologies were just emerging, the potential opportunities for including people with disabilities into the workforce were recognized [4]. Telework was seen as offering more control over the worksite, facilitating the inclusion of employees with severely limiting disabilities, and leveling the playing field for people with speech or mobility impairments. The paper called for more research, and fifteen years later, it is important to see to what extent telework has been able to deliver on those promises.

A review of literature on telework for people with disabilities [1] found encouraging evidence for the increased benefits of teleworking, but also noted pronounced limitations on the kind of work roles that could be largely accomplished using information technology. They noted the importance of looking beyond just productivity to also explore challenges around social isolation and developing social capital while teleworking. They pointed to the need to develop teleworking at a policy level, and also called for further research in this emerging phenomenon.

A survey of 373 employed people with disabilities [7] found that there was less uptake of telework (19%) than in the general population. Less than half of those who telework declared it as an accommodation for their disability, but those who did got more assistance from coworkers or services. They found that flexible scheduling was the paramount teleworking benefit, since it helped mitigate fatigue and pain issues. Of the 44% of teleworkers who said their telework was an accommodation for their disability, only 57% reported they were satisfied with teleworking as an accommodation, compared to 43% who indicated they were not satisfied. They speculated that this low satisfaction rate was related to other employment-related barriers associated with teleworking, but more research was needed to identify if there are other ways to improve the telework experience for people with disabilities.

Recent studies have looked at how specific user populations react to current remote collaboration technologies. Das et al [2] examined the use of popular collaborative editing tools, such as Google Docs, by people who are blind or visually impaired when writing together with sighted colleagues. They found inaccessible aspects to the tools that caused them to be neither easy nor robust to use in real life situations. They also found how speaking up about problems with accessibility could be detrimental to the collaborative working relationship with their colleagues. Zolyomi et al. [11] studied ways in which people on the autism spectrum found video calling to be stressful. They found that concerns around sensory sensitivities, cognitive load, and anxieties shaped their preferences for which communication channel to use when collaborating remotely. They developed coping strategies for moderating their sensory inputs, constructing mental models of conversation partners to help them interpret their conversations, and attempting to mask their autism by adopting neurotypical behaviors. Both of these studies identified accessibility concerns with remote collaboration tools that could become more problematic with increased use during the pandemic response.

Studying how people with disabilities react to remote work technologies used during the pandemic not only identifies accessibility issues that are important to address during this time, but also helps develop ways that telework could be more comfortable for all us even beyond the pandemic.

### 3 Interviewing People with Disabilities who Telework

As part of a larger study on the telework experiences of people with disabilities [9], 25 participants were interviewed over video calling. Participants were selected to get a representative cross-section across different types of disabilities. They included people in a range of roles from different companies.

**Table 1: Interview participants.**

P#	Age	Sex	Described disability	Occupation	Work status	Tele-work
P1	36-49	M	Blind	Software engineer	Full-time	FTTW
P4	≥ 50	M	Significant visual impairment	Database administrator	Part-time	FTTW
P5	≤ 35	M	Totally blind	Accessibility architect	Full-time	PTTW
P6	≥ 50	F	Totally blind	Accessibility testing	Limited	FTTW
P22	36-49	M	Legally blind	Website consultant	Part-time	FTTW
P23	36-49	F	Low vision & PTSD	Event management	Full-time	FTTW
P25	36-49	M	Legally blind	Digital ally consultant	Full-time	LTW
P10	≥ 50	M	Deaf	Global accounts mgmnt.	Full-time	LTW
P12	≤ 35	F	Deaf and ADHD	Comm. and marketing	Full-time	FTTW
P14	36-49	F	Profoundly deaf	Engr. project mgmnt.	Full-time	PTTW
P24	≥ 50	--	Hearing loss	Consulting	Limited	PTTW
P2	≥ 50	F	Multiple Sclerosis	Technology sales	Full-time	LTW
P9	≥ 50	M	Multiple Sclerosis	Consulting	Part-time	FTTW
P13	≥ 50	F	Spinal cord injury	Exec. Dir, not-for-profit	Full-time	PTTW
P15	≤ 35	M	C4 paralysis	Landscape architect	Full-time	LTW
P17	36-49	F	Quadriplegia	Finance analyst	Full-time	PTTW
P18	36-49	F	C4 quadriplegia	Policy and advocacy	Part-time	FTTW
P7	36-49	F	Tourette's & ADHD	Market research	Full-time	LTW
P8	≥ 50	M	Dyslexia	Customer support	Full-time	FTTW
P11	36-49	M	Dyslexia	Privacy law	Full-time	PTTW
P19	≤ 35	M	Autism, ADHD, Dyslexia	Mobile device developer	Part-time	PTTW
P20	≤ 35	M	ADD & Dyslexia	Software developer	Full-time	LTW
P21	≥ 50	M	Autism Spectrum Disorder	Customer support	Full-time	FTTW
P3	36-49	M	multiple chronic disabilities	Cybersecurity Engr.	Full-time	PTTW
P16	36-49	F	Mult. autoimmune & chronic	UX writer	Full-time	PTTW

Table 1 summarizes the 25 people interviewed for this study, their age range, gender, description of disability, occupation, work status (35 hours/week or more is full-time, 10 hours/week or less is limited), and telework status (100% of work hours is full-time telework FTTW, less than 25% work hours is limited telework LTW, and otherwise part-time telework PTTW). Participants are grouped by category of disability and their P# is according to the order in which they were interviewed. The participants included seven people who are Blind or Low Vision (BLV, shaded in blue), four people who are Deaf or Hard of Hearing (DHH, shaded in green), six people with limited mobility/dexterity (shaded in purple), six people who are neurodiverse (unshaded), and two people with chronic health issues (shaded in orange). The neurodiverse participants included people with Autism Spectrum Disorder, ADHD, Dyslexia, and Tourette's Syndrome. There were 14 men, 10 women, and one respondent who preferred not to state their gender. All respondents resided in the U.S.

The questions focused on the pandemic response are included in the Appendix. Interviews were conducted over video calling (Microsoft Teams or Zoom), which participants were comfortable using through their telework. All interviews were recorded and automatically transcribed using the AI-powered transcription service offered within the video calling tool. These transcripts were edited for accuracy when reviewing the video recordings. Participants were offered a \$25 Amazon electronic voucher for what was intended to be a 30-minute interview. The interview was reviewed by the Institutional Review Board of our institution. All interviews were conducted between March 13 and April 8, 2020.

## 4 The Effects of the COVID-19 Pandemic Response

The COVID-19 pandemic response in Spring of 2020 abruptly shifted almost all computer-based work to telework from home. Since the study participants regularly teleworked beforehand, this shift was not a new experience for them. But since the interviews were conducted in March and April of 2020, they reflected on how *their telework experience* changed now that everyone was teleworking from home all the time.

Some of the participants were in job roles that were not office-based, but out in the field or working with other colleagues who were remote, which is perhaps what enabled them to telework in their own positions. Thus, their work was not dramatically changed by the global shift to telework, and seven people reported that their work did not change much:

*Being on the spectrum, working from home a lot already. I haven't seen too much because, again, a lot of the people who I might work with or would work with are also remote. P19 (Neurodiverse)*

Observations are grouped according to whether the pandemic response led to improvements, new challenges, and opportunities for the future.

### 4.1 Improvements Prompted by the Pandemic Response

Participants mentioned several ways in which their telework experience improved as a result of having all of their colleagues also working remotely:

*...within meetings people tend to stay on track and stay on topic and we get the meeting done ... So, ultimately, I think it feels better, at least to me. P14 (DHH)*

*[previously] ...there's always the 15 minutes making sure it works online for the four people who are online... When everybody was online it works flawlessly. We didn't have to worry about projecting in the room and projecting online. P16 (Chronic)*

*I actually think it's kind of weird like everybody is way more punctual now. It sounds crazy, but it's true... No one's getting stopped in the hallway and a side conversation or you know, stopping to get coffee on the way. P14 (DHH)*

At least initially, meetings felt more focused and productive and started on time, both because the technology initiation was less complex and people were not getting waylaid on their way to meetings.

People also mentioned how maintaining social connections was being handled more explicitly:

*People are checking in more, which I think is nice. You know, just because I feel like people feel separated more. P17 (Mobility)*

*There have been some social, our GM... encouraged people to come together just and socialize, and he's been leading that off, too... to essentially actually carve out time for that kind of non-work work that is still really important, the way that we are able to collaborate and function. That's kind of a neat thing, and it'll be interesting to see how that's preserved even kind of post-COVID-19. P11 (Neurodiverse)*

*Some social talk... it's still happening and I think it's more inclusive for everyone because it isn't just a small group in the corner having that conversation, everybody is able to participate. P14 (DHH)*

*So, the technology doesn't prevent me from doing it. It's just, it takes more of a deliberate outreach than a 'Oh, I just passed this person in the hall and, you know, let me ask them how they're doing'.*  
P4 (BLV)

While participants appreciated that intentional efforts were being made to encourage socializing while they were remotely distributed, P4's comment recognizes that it still takes more effort at the individual level to maintain social connections with the affordances of current technology.

Of particular interest to people with disabilities is some of the ways that everyone working remotely leveled the playing field:

*It's so much more convenient for me. I cannot tell you because now... everybody's doing exactly the same thing I'm doing. They totally get it now, and so we just had our all hands meeting.... It was the best all hands meeting I'd ever been to... because it's so equal, I was engaged, I could watch the whole thing, I understood what was happening the whole time.* P16 (Chronic)

*There's probably a lot of people are like, 'Wow, you know, this is what it's like for remote people'. And actually you're seeing how powerful Teams can be in creating respect in making sure people are heard and seeing who's speaking and making sure you can go around the room.* P14 (DHH)

*When it's just two of us on a Teams call with 18 people in the room, the telecommunications issues, they don't feel them.* P1 (BLV)

*More of these issues [with remote technology] are being brought to the forefront or given more priority, because more people are using it... people are filing bug reports on things like that.* P19 (Neurodiverse)

Since most participants were previously among a small minority of teleworkers (if not the only one) on their team, they suddenly found their meeting experience was improved because everyone could be heard, remote people were being explicitly included, and people were getting more experience with the power of remote technology (and filing bug reports on issues that needed to be fixed).

A specific advantage that people who are deaf or hard of hearing noticed was that the frontal views of each person's face that the video captured made it easier to lip-read:

*Because everyone's participating on Teams and everyone's on video and it's easier to tell who is talking, it's easier to participate in those conversations by seeing people's faces directly rather than looking at one big meeting room full of heads and not really being able to see people's faces* P14

*What I like about Teams is whoever is talking pulls up onto the screen and I see the blue circle. And it's also helpful for the interpreter--they're not trying to guess based on what they hear.* P10

People who are deaf or hard of hearing are quick to point out that we all lip read during conversation, so while the frontal views especially help them understand what is being said, we all benefit from a clearer view of people's faces when they are talking.

Several people commented that more people were now turning on their video during remote meetings:

*...noticing that [company name] people more and more are turning their camera on.* P24 (DHH)

*One of the neat things right now about COVID-19 is, more people are turning their cameras on and I feel like I'm able to connect with somebody and understand them a lot more when I have all of the visual cues.* P11 (Neurodiverse)

*Because we are doing it more often, we kind of want to see one another, so I think that's part of why we probably did a video chat or a video call the other day... we're trying to use different methods of still being more present* P15 (Limited Dexterity)

*Although with this COVID stuff, it's, more [company name] people turning on their cameras... so it'll be interesting to see if [company name users] retain to turn on cameras for stuff like this* P20 (Neurodiverse)

*We used Webex where everybody was on... It's funny because half the people decided to not turn on their webcam. So it was a virtual Happy Hour where we're staring at each other's like blank screen sometimes. P17 (Limited Dexterity)*

Participants across all disabilities, except those who are blind or low vision, appreciated the increased usage of video to afford more social connection while working remotely. However, P17's comment indicates that not everyone is motivated to turn on their video camera, which will show up in some of the challenges experienced during the pandemic response in the next section.

## 4.2 Challenges Presented by the Pandemic Response

While an increased use of video seems like a natural response to the sudden shift to telework, P17's comment above shows that not everyone turns on their video cameras for remote meetings. People who are blind or low vision typically do not use video in meetings, and people who are neurodiverse may selectively turn off video or even selectively cover video windows being displayed to avoid distraction or expending the cognitive effort needed to process the video [11]. People with motor tics may also avoid turning on video to minimize sharing them with the other meeting participants. Thus, people with disabilities may prefer not to share their video in remote meetings, but may feel social pressure to turn on their video due to the increased use of during the pandemic response:

*With everything being remote now on Team meetings, things like that with everyone wanting that human connection, there's been more of a need, or an ask I should say, to have video on. So that's happened more recently. But that's not something I normally do. P23 (BLV)*

*I think the video thing is going to be a little bit of a tweak, maybe because I have to be camera ready more. P2 (Limited Dexterity)*

*One of the often unspoken expectations in the professional setting is that you're going to be on camera... It doesn't necessarily always work for me because I do use an external, larger screen display... if someone is sharing a slide deck, I need to kind of turn off my camera and get in front of my large screen display to be able to take that information in. P25 (BLV)*

P23's and P2's comments point out that people with disabilities who deliberately did not turn on their video cameras are now feeling more inclined to comply with the sudden social interest in having everyone's video camera on. P25 is someone who has low vision, whose disability is not necessarily apparent, until someone shares a slide deck through screen sharing, where he feels the need to explain why he will be turning off his camera and thus potentially disclosing a disability that others were not aware of. In this season of pervasive telework when the social expectation tends toward wanting a richer, higher fidelity connection with colleagues, a static, blank video window with a name label may be interpreted as lesser engagement with the meeting. P8 (Neurodiverse) proposed an alternative:

*I would love is if there weren't a static picture of you that comes up when you're not on video... if there's something more dynamic that could be done for people who either can't be on video or, in my case, like are not as comfortable 100% of the time being on video, that would be awesome.*

Avatars driven by movement sensors (such as Avatar Kinect [5]) or created through inputs from other modalities (such as <https://loomai.com/>) could provide some of the expressiveness of video without revealing all of the details. Or dynamic representations of sound, such as the sound waves often displayed in radio programs or sound equipment, would provide more sense of engagement without revealing the visual details. The design space could be explored for providing more dynamic, engaging alternatives to the static icons currently shown when users do not share their video or are connecting by phone.

While it has been reported that people are having more meetings during the pandemic, this increase can have some accessibility implications:

*For some reason, people feel the need to have even more meetings... I'm like, dear God, I'm in back to back meetings 6 to 7 hours out of my day. I'm working 15 hour days now to get my work done... With my increase in meetings, I haven't even been able to use my Dragon software, which was*

*provided to me as a part of my accommodations. Because I don't have the battery life in my headset and I'm in so many meetings that my battery is completely used up* P23 (BLV)

Since P23 has low vision, she uses Dragon voice command software connected to a wireless headset to provide input to her computer. But since she also uses the same headset to participate in online meetings, the increase in meetings drained her battery to the point that she can no longer use it for issuing voice commands.

People who are deaf or hard of hearing rely on clear video connections in meetings, especially with their ASL interpreter, but the pandemic response has had an impact on their meeting experience:

*The one thing that comes up, of course routinely and repetitively is person by person, their Wi-Fi or their Internet connectivity is variable. And so it's a constant conversation I'm having with interpreters as well as if I see a slowdown.* P10 (DHH)

*So right now with everybody being on the Internet and working from home and streaming and using Netflix, it has slowed down bandwidth for a lot of people which I know has been a huge issue for deaf individuals who rely on video quality for communication.* P12 (DHH)

While they can control their own internet connection, they rely on the video fidelity of their ASL translators and other meeting participants, which can be degraded by the increased load on residential internet service.

People who are neurodiverse expressed concern about the increased distractions in the home environment:

*I feel like my ADHD community lately... There's been a lot of talk on the channel is about, 'Oh my gosh, how am I gonna do this? How am I gonna work from home every day because there's so many things distracting me at home?' P7 (Neurodiverse)*

They not only have to deal with the distractions in their own home, but also all the distractions from others' homes that are transmitted through online meetings.

In summary, there are a number of accessibility issues that arise in using online meeting technology:

*The kind of barriers that technically for someone with a disability... they're blind and they're not very tech savvy, so, I might be able to send him a text with the dial in code [for a video call meeting]... but they may not be able to just double click it in order to pull it up because they use Siri to launch their phone calls.* P22 (BLV)

*There are some biases, just physical barriers that keep me and a lot of people from succeeding, in a... traditional workspace that shouldn't be online, but at the same time, if I can't run a meeting or be independent on a virtual meeting? .... Then that's a problem for me. It's suddenly, I have to bring attention to my disability in a way that I don't think I normally have to.* P18 (Mobility)

### **4.3 Opportunities Through the Pandemic Response**

Because some people telework as an accommodation for their disability, people with disabilities may have had prior experience with telework before the pandemic. This experience enabled them to help their colleagues who were abruptly shifting to telework because of the pandemic response:

*I don't want to be isolated, but I don't feel isolated as much, I think as they do. And I don't know if that's because I can't see and... just talking to somebody is very similar for me on the phone as opposed to in person... They were also extremely unhappy about being stuck in their homes. And just as somebody with a vision problem like I'm used to being stuck.* P1 (BLV)

*Many of my colleagues, this is the first time they're doing it, so I was actually viewed as a bit of an expert and some of my suggestions or insights for newbies at telework were actually sought, which I was delighted to share.* P25 (BLV)

Based on their prior experience, they were able to help their colleagues up the learning curve of working remotely, both in terms of the technology and work practices.

Several participants hoped that this shift could help their organizations embrace telework more:

*Even people that weren't comfortable with the technology, now if they want to socially interact, they have to be comfortable with it. So I think we're going to see, wider adoption of this technology as a result of that.* P22 (BLV)

*So I think it may be, one of the good things to come out of this unfortunate situation we're in is that I think there's going to be a bit of a sea change about people's ideas about how connected you can be when you're not in the same room.* P13 (Mobility)

*You know, I'm kind of hopeful, keep it going, you know where we could just be at home.* P17 (Mobility)

*It's going to be interesting to see if, out of all this COVID stuff, that [company name] as a whole kind of rethinks about the efficiencies of teleworking and maybe is able to value that more.* P21 (Neurodiverse)

*I think the biggest difference also is the respect for asynchronous work, which I think is awesome for people with disabilities who telework. Because you're an ADHDer, or you've got to take breaks all the time* P7 (Neurodiverse)

Several of these comments came from work cultures where teleworking was offered, but perhaps limited by company policy or manager preferences or not fully supported or embraced. Having had to switch to teleworking out of necessity and seeing how effectively it can be done (even under circumstances that were stressful for other reasons), several participants saw an opportunity for teleworking to be more broadly accepted, which could improve their overall work experience.

## 5 Conclusions

Studying how people with disabilities are affected by the pandemic response not only helps us make sure that the remote collaboration technologies that we are all needing to use during the pandemic response are accessible to all abilities, but also could give us a sense of issues that would make working remotely more comfortable for all of us. For example, building on the observation that people who are neurodiverse sometime turn off the video to manage the amount of cognitive effort expended during remote collaboration could give us some insight into the “Zoom fatigue” that is being widely reported in the public media. Exploring the design of more engaging representations when not sharing video would not only help people who are neurodiverse or blind or low vision, but also people with busy and distracting family environments, in situations where video connections may not be appropriate, or with only enough connectivity to join by phone instead of video. The interviews of people with disabilities provided a different perspective on telework, which has now become a very pervasive work experience that is likely to grow in importance in light of the long-term effects of the pandemic response. While people with disabilities may have been early to embrace telework as a way of accommodating their diverse abilities, their experiences may help all of us become more effective in teleworking.

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## APPENDIX

The section of the interview guide used for this study included:

- Has anything changed in your telework experience with the recent company initiatives for people to work from home in response to the COVID-19 (new coronavirus) outbreak?
- a. Has the amount of online meetings increased or the number of other people joining online increased?
  - b. Are there any differences in online meetings because more people are attending remotely, instead of just you?
  - c. Are your colleagues getting new or more experiences joining online meetings when *they* are remote? Has that prompted any changes in the overall online meeting experience?
  - d. Are there any changes in collaborating with your team you wish would continue after the COVID-19 outbreak has subsided?

How could teleworking be improved for you (e.g., equipment, future technology, processes, support)