Mixed abilities and varied experiences: a group auto-ethnography of a virtual summer internship

When the COVID-19 pandemic hit the world, many people were forced to convert their daily lives to a virtual format. In this new, virtual environment, accessibility barriers changed, in some respects for the better (e.g., more flexibility) and in other aspects, for the worse (e.g., problems including American Sign Language interpreters over video calls). Company Research held its first class of all virtual interns in 2020. We the authors, full time and intern members and affiliates of The Team Name   a team focused on accessibility, present a reflection on our experiences as a team consisting of members with a variety of abilities, positions, and seniority during the virtual summer intern season. Through our autoethnographic method, we provide a nuanced view into the experiences of a mixed ability, virtual team, and how the virtual setting affected the team's accessibility. We then reflect on these experiences, noting the successful strategies we used to promote access and the areas in which we could have further improved access. Finally, we present guidelines for future virtual mixed-ability teams looking to improve access.

1 INTRODUCTION

The COVID-19 pandemic has accelerated changes in the way that many people collaborate. In particular, many schools and workplaces in the US have shifted interactions to predominately online remote settings [33]. This change involved shifts in protocols, including a higher reliance on remote connectivity software, including video call apps (e.g., Zoom and Skype) and integrative platforms that facilitate various forms of remote collaboration (e.g., Slack and Microsoft Teams) [38]. Many people making this shift to remote collaboration are disabled, as about 1 in 4 Americans have some type of disability [16]. Furthermore, this group of virtual collaborators has a diverse range of disabilities and accessibility requirements.

This shift to remote collaboration impacted access for many people with disabilities. Since 2020, several papers have explored the challenges and benefits of a virtual setting in the context of accessibility with foci on specific technology features (e.g., the effects of text chats during meetings, group video calls [38]) and personas (e.g., people who are Deaf [25]). However, no work has yet explored challenges and synergies of meetings among people with multiple abilities in a virtual setting (e.g. blind, d/Deaf, hard of hearing, chronically ill, ADHD, and non-disabled) . Mixed-ability teams must not only ensure that individual team members have access, but also face the challenge of communicating and coordinating across disabilities. For example, accommodations may conflict between different disabilities (e.g. a preference for visual communication by DHH individuals vs. oral communication by BLV team

[Anonymous]

members). Organizations may not be prepared to accommodate such diverse teams and needs, especially during a rapid shift to virtual environments.

In this work, we examine the interplay of virtual work and mixed abilities to help address such problems and enrich the growing field of work about virtual engagement. Utilizing an auto-ethnographic research method, 11 team members of Company 's The Team Name journaled about our experiences on the mixed-ability team for three to four months. Five authors, whom we refer to as "meta-authors," then iteratively examined the data, to identify five key, interdependent themes. We experienced several *virtual (in)accessibilities* that arose from the new, online context. As this was the first virtual internship and The Team Name 's intern class with the most diversity in abilities, we experimented with ways of establishing and executing accommodations in the workplace. We quickly found that the list of mixed-ability accommodations we needed to follow was *difficult to remember*, and in some cases, accommodations *conflicted with each other* in ways that had not been experienced in-person. Finally, we discussed how important *allyship* was this summer, and how *power dynamics* impacted overall accommodation success.

We also created a set of guidelines around how we would advise those in a similar situation, reflecting on which norms and accommodations we established for the summer were successful in promoting access and which had room for improvement. These guidelines focus on 1) the community co-creation of norms that leverage interdependence and shared vulnerability, 2) the invisibility of accessibility failures and access labor, and 3) the impact that attitude had on accommodation execution and overall comfort with discussion of access needs.

In summary, the primary contributions of this work include: (1) in depth accounts on five key factors (virtual in-accessibility, difficulty remembering access accommodations, conflicting accommodations, allyship, and power dynamics) that influenced our experience, (2) reflections on how these factors interplayed and helped or hindered the accessibility of our group, and (3) a set of guidelines for future virtual mixed-ability teams.

2 RELATED WORK

2.1 Accessibility in Remote Work

Remote work practices, and its challenges and benefits, for non-disabled people are well documented in the literature [4, 6, 15]. A smaller number of prior studies have also explored positive and negative aspects of remote work for people with disabilities [26, 29, 30]. For example, the opportunity to work from home can increase flexibility in work routine and thus reduce pain and fatigue-related barriers for people with disabilities, particularly those with limited mobility and chronic health conditions [30]. Despite such scholarly attention towards the prospects of remote work for people with disabilities, employers and law enforcement agencies have not traditionally considered remote work as a form of "reasonable accommodation" under the American with Disabilities Act [49] due to the perceived reduction in productivity and performance of essential job duties while working remotely [1]. The sudden shift in work practices due to the COVID-19 pandemic, coupled with demonstrated productivity [33], however, has strengthened the feasibility of remote work. As such, many organizations have shown interest in a hybrid work model with flexible options for remote work in a post-pandemic era [36].

While increased acceptance of remote work may raise new employment opportunities for people with disabilities [40], researchers have begun studying how discriminatory organizational policies [17, 19] and lack of accessibility in remote collaboration tools [46] may also perpetuate and recreate accessibility challenges in remote work. For example, Tang [46] highlighted that mainstream video calling tools negatively affect digital representation of people with vision and hearing impairments, while the highly visual nature of screen sharing makes it difficult for screen reader users to consume

shared content. Kushalnagar and Vogler described the technical complexities and workarounds for deaf and hard of hearing (DHH) people during teleconferencing sessions [25]. For example, DHH people need to navigate multiple visual channels for access (e.g., lip reading, American Sign Language (ASL) interpreter video, captions) while simultaneously following presenter slides and chat threads. Neurodivergent people who have autism, attention deficit/ hyperactivity disorder, learning disabilities and psychosocial disabilities must also navigate various sensory and cognitive stressors [53] and negotiate for accessible communication practices during remote meetings [10]. Collectively, this growing body of research sheds light on the access needs of people with disabilities in coordinating and communicating over remote collaboration technologies when teams are distributed in time and space and outlines guidelines and best practices for improving accessibility in remote work [10, 25, 46]. We extend this body of work by presenting and reflecting on our remote work experience as a team that includes disabled and non-disabled people with a variety of accommodation needs.

2.2 Accessibility in Mixed-Ability Collaboration

A large and growing body of literature within HCI accessibility investigates accessibility in mixed-ability teams. Closely related to our study, Bennett et al. [2] put forth the concept of interdependence drawing on disability studies scholarship [22], in which access is conceived of as co-created and sustained through "relationship between people and things." Relatedly, prior work has explored the ways in which blind and sighted people collaboratively establish accessible living space [5], navigate unfamiliar environments [51], and perform shared tasks such as shopping [52], reading [45], and writing [9] together. Through video ethnography of visually impaired athletes and spectators, Thieme et al. foregrounded how negotiation of ability and assistance is entangled with interpersonal relationships, and how technology can be a meaningful part of ability negotiations instead of replacing human assistance [47]. Others have studied co-located collaboration between d/Deaf and hearing professionals [50], and between neurodiverse team members [54], where people with and without disabilities co-created access through moment-to-moment embodied interactions.

A common thread in prior work is that disability and accessibility are not static for an individual and that accommodations are not limited to certain assistive technologies and services [20]. Rather, accessibility is produced through "care work" [34] where people with and without disabilities continually attend to each other and fluidly adapt their work routines [3]. For instance, Jain et al. shared how graduate students with disabilities and their able-bodied allies established "uncharted accommodations," and minimized accessibility issues by customizing technologies in-situ [24]. Still, these studies revealed tensions arising when people with diverse access strategies collaborate [10, 24], and how people compromise and work through conflicting access needs [10, 20]. Situated in this emerging literature, our work brings in new perspectives by exploring all-virtual mixed-abilities collaboration, from diverse perspectives.

2.3 Invisible Disability and Access Labor

The concepts of disability identity and visibility have a fraught history within the HCI and assistive technology literature. ASSETS and HCI scholarships have predominantly focused on specific sensory and cognitive disabilities, whereas mental and chronic health conditions that do not have continuous outward symptoms have remained largely underexplored [28]. Furthermore, much research carries an implicit medical lens, where diagnostic labels decide what counts as disability [37]. However, recent studies that draw upon disability studies scholarship reject a medicalized deficit narrative and foreground lived experiences of disabled people to uncover the nuanced personal relationships people have with disability identity, visibility, and disclosure (e.g., [14, 43]). For instance, the use of visible assistive tools (e.g., wheelchair or cane) can be beneficial in certain situations by "legitimizing" disabled behaviors [35], while

[Anonymous]

also perpetuating harms imposed by stigmatization [43]. Thus, visibility of disability (and assistive technology) and social acceptability complicates when and how disabled people choose to hide their disability and when they disclose and advocate for accommodations [7, 31].

Related to this discourse, researchers have also foregrounded the invisibility of access labor [5]. Disabled people often expend significant time and effort to work through and educate their peers about accessibility issues [2, 5]. Power dynamics and ability-based hierarchies also play a role, where part of the invisible work involves the emotional labor of weighing potential social costs against accommodation benefits [9] and navigating ableist institutional systems [42]. In our mixed-abilities experience, we explore the impact of virtual collaboration on visibility of both disability and accommodations, and the impact on access, allyship, and team dynamics.

3 METHODS

Our approach to data collection and analysis follows autoethnography, a qualitative research method where the researcher positions themselves as the participant and collects and examines data through self-reflection detailing their lived experiences within particular socio, political, and cultural contexts [13]. In the past decade, autoethnographic methods have been increasingly used in HCI research [21, 27, 41] to foreground rich personal insights that often cannot be captured through other research methods [11, 32]. Specifically within the field of accessibility, a number of recent studies have incorporated autoethnographic methods to center reflexive self-narratives of disabled researchers [20, 23, 24, 44].

3.1 Data Collection

Data collection began in June 2020 and consisted of two artifacts: fieldnotes [39] – notes documented within a week of an 'event' with people with mixed abilities, and retrospective accounts [12], – accounts of past events generated from memory. Each field note or retrospective account contains a narrative description of the event (including technologies and stakeholders), the writer's personal interpretation (including emotional responses). Events included social meetings, weekly team meetings, Research Org-wide social events, and organized intern events. In total, the retrospective accounts and fieldnotes document experiences of 11 people, across 7 main events, in about 6,000 words.

Through our journaling process, we established privacy by allowing contributors to report in separate documents which were hidden from the contributors. Only the meta-authors were able to see this data, with explicit permissions from the contributors.

3.2 Data Analysis

The experience reports were analyzed using open, axial, and selective codings to articulate the social, cultural, and personal implications of mixed ability environments. At the beginning of the analysis, the first author read the experience notes and created eight initial codes (e.g. hidden access needs, power dynamics). These codes were shared with other meta-authors and revised based on critical discussions, which included adding other salient codes and removing or merging codes. This process generated nine axial codes. To ensure external validity and avoid misinterpretation [27], the final axial codes were shared with the authors, who coded their own experience reports under these codes on a shared document During this process, we also allowed any new reflections on the contributed data relevant to the axial codes. Finally, the axial codes were combined into the final five overarching themes presented below, and exemplary vignettes were collected from the notes. These themes, codes and vignettes form the foundation of this autoethnographic

Table 1. The demographics of the 6 authors and 5 meta-authors who participated in the auto-ethnography. This is a single column figure as per the new ACM template.

Name	Disability Status
M1	Disabling chronic illness
M2	None
M3	Hard of hearing
M4	None
M5	None
A3	None
A2	None
A6	ADHD
A1	Deaf
A5	None
A4	Blind

narrative. In addition, following autoethnographical best practices [13, 27], the paper drafts were shared at various stages with the authors.

4 TEAM COMPOSITION AND DYNAMICS

As a result of the COVID-19 pandemic, Company had its first all-remote summer intern class. The virtual internship process was new and therefore introduced accessibility and other challenges. Additionally, the group of interns hired by our team, The Team Name , had the most diverse range of abilities in years. We describe the team and internship experience to contextualize our findings around working on a mixed abilities team in a fully virtual, industrial setting.

4.1 Biography

The Team Name consisted of a diverse set of individuals with respect to their backgrounds and identities. Full-time Company employees with a range of experience in industry and Company served as official and unofficial mentors of The Team Name interns or other teams that overlapped in focusing on accessibility. All of these official Team Name members and affiliates attended weekly hour-long meetings to discuss research topics.

The backgrounds of the meta-authors provide biographies in detail to provide context for how their backgrounds and identities influenced the study method. Looking to all authors, 5 authors identified as Asian and 6 as white; 4 identified as women and 8 as men; the average age was 32.9[1] (range 24-60); and disability status is summarized in Table 1.

M1 is a second year PhD student. She identifies as disabled because of her chronic illness that morphs every few years. Her invisible disability often gives her passing privilege. This internship, she faced significant, easily triggered motion sickness. A few seconds of an unsteady camera made her sick to her stomach for hours after. Her research is approached with a lens of disability studies, disability justice, and her own experiences with disability and currently focuses on accessibility of higher education.

M2 is a fourth year PhD candidate and worked as a research intern with M5 over the summer. Broadly, her research focuses on studying and designing for accessible collaborative content production in mixed-ability teams. Her work is informed by literature in CSCW and disability studies as well as her in-depth fieldwork and volunteering experience at local communities where she designs technologies with and for disabled community members.

---

[1]One person abstained.

M3 is a fourth year PhD candidate. His research focuses on design and evaluation of sound sensing and feedback technologies for people who are d/Deaf and hard of hearing. M3 identifies as hard of hearing and used real-time captioning service during his internship.

M4 is a researcher affiliated with The Team Name who often attends The Team Name meetings and collaborates with the team. She is a member of a different lab, which is located in a different city, and sometimes joined The Team Name meetings remotely. Her research focuses on building systems that expand access to information for those with sensory disabilities. She was an intern mentor this summer.

M5 is a researcher on The Team Name with research interests around understanding the accessibility of remote collaboration technology and identifying design implications for the technology. During the summer, he mentored M2 and another intern. He has always worked remotely from the rest of the Team Name that is co-located in the [location anonymized for submission]

Finally, in this paper when we refer to the experiences of disabled interns, we are referring only to those who disclosed their disability status and chose to share their experiences with us, though there may have been other disabled team members. The experiences of the disabled interns who contributed to this work do not necessarily extend to other people with disabilities on the team.

4.2 Regular Activities and Technical Infrastructure

In Company 's first ever all-virtual internship, The Team Name replicated many in-person experiences typically offered during summer internships. Work meetings, such as the weekly Team Name meeting that existed pre-COVID, persisted in virtual form over group video calls. During these meetings, interns were introduced, announcements were shared, research was discussed, and presentations were given. To replicate impromptu socialization, the Team Name manager created weekly meetings intended for non-work conversation. Interns created their own weekly lunch chats, which became a social space for talking about topics from research to favorite restaurants.

SoftwareName and email were the primary tools used to support remote collaboration and communication. SoftwareName is a combined communication tool and file management system. Both direct messaging and channels for groups of employees could be made for text-based conversations. Video calling was a supported and integrated feature from the start of the summer, but rapidly evolved as SoftwareName became more popular and released new features. In video calls, users were able to turn on and off their camera and microphone. SoftwareName automatically arranged the videos shown to a user, prioritizing people with their cameras on and who are speaking with their voice. However, users could curate who was shown on their screen through a pinning feature. At the beginning, a maximum of nine videos could be shown at a time, but this number increased to 49 later in the summer. A text-based chat was also created for each video call, allowing for simultaneous communication across two main channels; this chat persisted after the meeting ended. Users could also share their screen or an application window, allowing for presentations.

4.3 Accessibility Accommodations

Accommodations were requested this summer to ensure that interns with disabilities had equitable access to all materials and events. These accommodations mainly took two forms: accommodations that people with disabilities established for themselves, and accommodations that required norm changes among the full team.

4.3.1 Self-Established Accommodations. Self-established accommodations were controlled by the intern with a disability and included include requesting an ASL interpreter, visual interpreter, or captioner which are often critical for access

to meetings and/or company-wider intern events; all of these were requested by individual interns this summer. The availability of these professionals determined the ability of interns to attend events, particularly those that arose spontaneously throughout the summer.

4.3.2   Norm Changes: The List of Best Practices. Other accessibility accommodations required effort and commitment from all team members to be successful, as they altered meeting norms. Accessibility guidelines for the team meetings were established at the beginning of the summer by the manager of The Team Name . Interns at Company had different start dates, leading to frequent changes in the disabilities represented in the team. Consequently, The Team Name manager sent out an email every week with the list of accommodations to be followed. The final **list of best practices** that was communicated to the team via email was the following:

- Please try to speak slowly, so that captioners and interpreters can keep pace! It may help for you to turn on the live AI captions in SoftwareName so you can get a sense of how quickly you are speaking.
- Please introduce yourself (e.g., "This is [Joe]") when you are talking so that people who are blind or who are following the captions know who is speaking.
- Please make sure any presentations (powerpoint, video, etc.) follow best practices for accessibility – run the accessibility checker on your slides! Follow these guidelines for accessible presentations: http://www.sigaccess.org/welcome-to-sigaccess/resources/accessible-presentation-guide/
- If you are walking around during a meeting, please turn off your video to avoid triggering nausea in participants prone to motion sickness. Please also avoid using "blurred" backgrounds, which are triggering nausea in some participants. If you are presenting a document, please try to limit scrolling, which can also trigger nausea – slides that fit in a single frame rather than a scrolled word document may help with this.

While this email was circulated regularly, there was no persistent place where this information was stored outside the email. Additionally, there were accommodations shared late in the summer that were not included in this list. For example, M4 and A1developed a guide for how a presenter can show both the active interpreter's video and their slides during a presentation and how to pin presenters who use ASL. However, these accommodations were not reflected in the list of best practices, to our knowledge.

5   VIGNETTES OF OUR EXPERIENCES

Our experiences this summer were shaped by the intersection of our diverse backgrounds, our technological tools (SoftwareName), and the accessibility that was established by group norms. To best demonstrate the complex interweaving of these key factors, we share short stories from our time together.

5.1   Virtual inaccessibility: "You're on mute"

During one meeting, there was a transition from one intern making a presentation to a presentation by M3 , who is hard of hearing. M3 was on mute and started sharing his screen for the presentation, which meant that he could only see his own video and the video of the person who most recently spoke. While we tried to alert him that he was still on mute, it seemed impossible to get his attention. Since we knew he couldn't hear us, we tried waving our hands and typing text messages in the shared chat; nothing worked. Eventually, one participant made a paper sign that said "you're on mute", but even that took a while to become visible because he had to speak long enough for his video to be shown. This experience pointed out a cascade of accessibility problem with the video conferencing software while sharing slides that disrupted the meeting.

5.2 The multi-modal scavenger hunt

The Team Name had a morale event that featured a multi-modal scavenger hunt. Members of the team were invited to create accessible, anonymous submissions in response to broad prompts (e.g., "Find something that's always missing"). During the actual event, few people created submissions. Those that did often took photos with associated alt text or involved music which had captions. Creative submissions incorporated visual and audio elements, like a drizzle of oil sizzling in a pan. Those who did not submit either felt that it was too challenging or not possible to make a submission that was accessible or near-equally engaging for all people on the team (e.g., a photo is a much richer experience for sighted people than alt text is to BLV people).

Another event at the morale event was a "passing the ball" activity in SoftwareName ' Together Mode. In Together Mode, videos of all participants are placed in a single scene with a virtual background. The task at hand was to take a physical object from one's home and virtually pass it to one's neighbor in the scene. The first people who received the ball from their virtual neighbor were A4 and M3 , who took some time to pass on the ball because of inaccessibilities and confusion. As M5 reflects: "Again, the activity ran immediately into an accessibility delay, where we had to sufficiently explain the activity for A4 to respond in concert with the other participants. So, right off the bat of an experimental, accessible activity, we ran into some awkward delays involving accessibility."

6 FINDINGS

Through working on a mixed-abilities team this summer, several themes arose as key factors that impacted our experiences. The interconnectedness of the themes cannot be overstated. For example the presence of power dynamics in an interaction could improve or actively hinder the allyship or accessibility of a meeting. Therefore, we encourage readers to read the entire section, even if they are seeking information about one theme, as the understanding of an individual theme is not complete without understanding of its interplay with others.

6.1 Virtually induced (in)accessibility

Meeting "virtually", exclusively through online collaboration technologies, directly impacted the accessibility of the interactions, especially because many of our group meetings included a mixed set of abilities that involved a combination of assistive technologies or accommodations. We will first discuss ways in which meeting virtually afforded some accessibility opportunities, before detailing the challenges raised.

6.1.1 Virtual meeting accessibility opportunities. Fully virtual meetings offered a few accessibility advantages over meeting in-person. Extending prior work [46] we saw how the multiple modalities of the video conferencing software offered some accessibility advantages. The inclusion of text chat in all video calls [38] meant that people could easily choose a modality that fit their ability to contribute to the meeting. The text chat channel provided a convenient and efficient way to share very specific information, such as names and URLs, providing more convenience than in-person meeting, where names would have to be spelled out or shared on an additional tool. Since these links persisted in the chat after the meeting, the burden of notetaking was reduced, as the links could be followed up on afterwards.

6.1.2 Virtual meeting inaccessibility challenges. While the video conferencing software we used meets basic accessibility requirements, our usage among a team with mixed abilities revealed some challenges largely revolving around 1) incompatibility between video-conferencing software and assistive technologies and practices employed by people with diverse abilities, which often led to 2) decreased visibility of disability and increased access labor.

Our video conferencing software created several access barriers for people who use ASL. The team encountered issues around not being able to see participants who were silently communicating through ASL (which meant that they never created sound, which the video conferencing software used to prioritize video streams to display). To address this issue, we recommended an accommodation of pinning the video of participants who were communicating through ASL. However, this distributed solution required each meeting participant to individually remember to do so, as there was no mechanism to pin that video stream for everyone. M4 : *"It was quite frustrating to me when my mentee's video [who was deaf and communicated via ASL through an interpreter] was not included in the set of videos displayed during large meetings ... it seemed that in many cases the other meeting participants were happy to continue without taking action to remedy the situation."* Not seeing the signer meant that the expressive affect of the person was lost. It also resulted in confusion among participants over who was contributing (e.g., several attendees confusing the interpreter for the deaf individual), and more generally, unequal access and inclusion.

Seeing critical people, such as an interpreter or a speaker, was more of a problem when a participant decided to share a screen or application in the virtual meeting. The video call's interface gave more screen space to screen sharing, which was afforded by reducing the number of video tiles and the space for live text captioning. This change could mean losing sight of an ASL interpreter, unless their video tile was pinned. M4 and A1, spent considerable time developing a protocol when meetings involved screen sharing where the slide presenter pinned the interpreter, and then did a full screenshare that included the slides and interpreter. This wasn't a perfect solution though, as internet connectivity impacting video streams became more of an issue, and people often talked during transitions between interpreters or other technical problems. It also took many rounds of iterating, escalating, and collaborating with technical support and leadership to get this solution implemented.

Another issue with ASL interpreters was that they appeared in the video conferencing software's interface without any information about whom they were supporting. A3 commented that, in the context of in-person meetings, ASL interpreters were typically positioned across from the person they were supporting and clearly maintained eye contact with them. In contrast, ASL interpreters in the video conferencing software appeared in their own video tile, often without explanation. M5 : *"It just seemed like accessibility practices (like ASL interpreters and captioners) were silently introduced to meetings, without any explanation or guidance around best practices. I recognize there is a design tension, as you don't want to draw undue attention towards an accessibility accommodation, but there's also quite a bit to learn how to interact with the accessibility resources which are not always self-evident."* This lack of context around interpreters sometimes created confusion, especially early in the summer. Introducing new interns from a list of meeting participants became awkward when people did not realize if a person they did not recognize was a new intern or an ASL interpreter.

Similar to ASL interpretations, the delays of captions led to less equitable access to DHH caption users, particularly in online settings that limited the shared awareness of those delays. Turning on live text captioning was a choice for each participant, so those who did not turn it on were unaware of the delay speech to caption delay. A6 after turning on captions reflected: *"I never noticed before that SoftwareName's captions have a delay which led to me reading the caption of the [one] speaker as another person already started talking. That led to some difficulty following the thread of the conversation whenever it moved through the DHH speaker."* This delay was even less visible if someone was using a private CART or ASL interpreter, which wasn't seen by any other meeting participant. Because there was no shared awareness of these delays, people were not getting feedback on how to pace their conversations relative to the delays involved in communicating with everyone.

Moreover, the limited view that meeting participants saw of a disabled intern often did not include their accommodations. For example, interpreters and signers were not linked to each other, their videos were not prioritized for

each other, and if people went to breakout rooms, interpreters and deaf participants could be separated. Therefore, participants using captioners or interpreters often performed a considerable amount of access labor to develop creative workarounds, which involved joining the main meeting and a separate video call on a separate device with an interpreter. This labor was obfuscated by the video conferencing software.

As a consequence of this hidden access labor, inaccessibility was great, perhaps greater than in person, when norms or accommodations were broken. For example, M3 almost always uses a captioner in meetings. A captioner's absence would have been visually obvious to sighted people in person, and colleagues may adjust their speaking speed or come up with more accessible modes of communication. However, lack of a captioner is easy to miss in virtual meetings. Similarly, one intern, M1 , experienced severe motion sickness that was triggered by several videos in meetings over the summer. While someone closing their eyes to avoid watching a problematic video or becoming physically ill is very visible in person, online it is almost impossible to notice. A2: *"After presenting my research at the lab meeting, a fellow intern mentioned to me that one of my slides with a time lapse video as the background caused them severe nausea. I had no idea this could potentially be an issue ... The intern said that they often didn't mention these things ... I wish I had known sooner."* Without visual cues of nausea (e.g., M1 looking unfocused or pale during meetings), M1 had to choose between either repeatedly getting sick from people's videos without their knowledge or starting a direct conversation with a peer or mentor.

While access to multiple modalities for communicating (video, audio, text chat, etc.) enabled some accessibility opportunities, it also introduced challenges in attending to all of these modalities during a meeting. The text channel was often used for concurrent side chat or sharing information like links. It also allowed multi-tasking by participating in other concurrent chats, unrelated to the meeting. This problem of split-attention, while experienced by nondisabled virtual meeting participants [38], may be exacerbated for disabled participants. For example: A4 : *"Our computers' ability to help us multi-task induces stress because of a perceived expectation to be at multiple places (in a meeting + an other chat for example) at the same time ... With both the meeting audio, and the screen reader blaring notifications in my ears, I couldn't concentrate on the meeting after a point and I even dropped off a few meetings as I felt that I was being disrespectful to the speaker by pretending to be there, and not really listening."* Attention splitting was also felt by M3 who had to follow captions and chat content.

6.2 Power Dynamics

Upholding accommodation norms was a core value of our team, but *power dynamics* affected our degree of success. M2 noted: *"Following "best practices" or guidelines that come from top down (e.g., the manager...) helps to set the tone of the meetings and make others aware and mindful of adapting to practices that are more accessible."* For instance, in The Team Name meetings, we found that if senior members announced their names before speaking, other people were more likely to follow. Contrarily, if a senior researcher did not follow the agreed upon set of norms, there was often poorer adherence.

The presence of hierarchy within the team made it difficult for junior team members to advocate for behavior changes. One intern, M1 , noted the inner conflict that she felt when senior researchers were not following the norms. M1 : *"I occasionally put a reminder of "are we still saying our name before we speak?" in the chat, but it felt so weird to correct others when most of them are very senior researchers who you are praying will think highly of you when you're on the job market. I wish more FTE's had called this out."* These were not people that she felt comfortable correcting because of the power differential and desire to make a good impression. But, at the same time, she felt guilty for not calling out those

breaking the norms, as reminding people to adhere to the norms is an important part of being an ally to her disabled friends on the team.

At the same time, it can be difficult for senior team members to determine when their advocacy will be helpful or harmful. M4 presents an example of a similar conflict created by power dynamics, but from the perspective of a full-time researcher. M4 : *"As a mentor to a person with a disability, it can be difficult to strike the right balance between shielding the intern from having to advocate for themselves, and making sure that you are not speaking/advocating for them unwantedly."* We see that someone in a position of power, like M4 , can help improve the access for disabled team members by leading by example or addressing accessibility issues when they arise. However, there are circumstances when an intern does not want to draw attention to their disability or access needs. Interns may also prefer to advocate for themselves in general, knowing their own needs far better than their mentor. If a mentor continues to advocate in these situations, an intern may feel embarrassed or patronized. Such concerns and considerations may prevent senior team members from speaking on behalf of more junior team members, even while cognizant of accessibility issues.

6.3 Difficulty remembering accessible practices

In the list of accommodation we created (see 4.3.2), some of the enumerated items included multiple requested actions or things to watch out for (e.g., the guidelines around motion sickness), while others listed a single specific action (e.g. stating one's name). Keeping track of and implementing multiple behavior changes while also engaging in meeting content proved to be a challenge for many meeting participants.

Difficulties implementing accommodations were compounded by the novelty of the accommodations to some. Many team members had experience with some disabilities, but not all. As a result, nearly all meeting participants faced a learning curve in learning how to interact with some attendees. M5 : *"I remember the first time I was called out for not verbally identifying myself before speaking at the [team] meeting on July 2, I quickly moved from being annoyed to realizing I needed to learn a new practice, and it just took a little nudge for me to make that shift–I think we needed more of that throughout."*

Variability in the set of accommodations that needed to be implemented from meeting to meeting compounded difficulties. The set of meeting attendees was not constant, and as a new disability appeared or disappeared from the group, the list of accommodations that needed to be top of mind changed. This summer, the attendee list was particularly prone to fluctuate, as interns began and ended their internship experiences on different timelines. M4 : *"It becomes increasingly difficult to always remember all of the accessibility protocols during meetings as the number of disabilities grows … This becomes more difficult if you are an occasional meeting participant, and if the set of disabilities/accommodations changes over time."*

Likely as a result of the cognitive overload, it was common for people to drift away from the guidelines. For example, meeting discussions would often begin with each person saying their name as they began to speak, but would be abandoned by the end. Participants entered each experience with the intention of inclusivity, but struggled to maintain inclusive behaviors. This drift away from adherence to guidelines occurred during individual meetings, but also over the course of the summer. A2: *"I noticed each week that there was a solid attempt to say our names prior to speaking. However, as the meetings continued, this practice rather quickly deteriorated."*

Difficulty implementing accommodations seemed to correlate with how clearly the accommodations were outlined for the group. In particular, the group largely failed at implementing accommodations related to motion-sickness, which were all grouped together into a single bullet, regardless of when and how the accommodations needed to be implemented. This was likely a result of how these accommodations were curated – requested by individuals

with particular disabilities – rather than by how they would need to be consumed – by meeting participants with particular roles (e.g. presenter vs. attendee) engaging in particular activities (e.g. preparing a presentation vs. engaging in conversation).

6.4 Conflicting access needs

Maintaining coordination and communication among people with diverse access needs and strategies led to situations where these needs conflicted with each other [10, 20]. For example, as noted before, screen sharing in the video conferencing software we used limits the number of attendees one can see, often excluding the interpreter. M4 , a research manager described the dichotomy in presenting during meetings that included ASL interpreters: *"...we came up with a protocol where the meeting presenter shared their screen, which included both the pinned interpreter and the meeting slides. This enabled everybody in the lab to view the interpreter at a reasonable size while simultaneously viewing the [presentation]. However, sometimes this resulted in the slides (especially text) becoming prohibitively small to read."* Similarly, when M3 was sharing his screen for a presentation, the videos of other attendees were very small on his screen, so we were not able to get his attention when he was muted.

Other accommodations could increase access in one dimension while decreasing access in another. For example, we found that allyship efforts via text-message backchanneling also split participant attention. Performing allyship through backchannels can increase access through advocacy, but the split attention [38] this requires can limit meeting access, as M3 and A4 noted earlier. Relatedly, A5 , a sighted, hearing person, described challenges in adapting to the influx of information in multiple modalities during a remote meeting with automatic captioning. She was distracted and overwhelmed since *"the speaker used a high rate of speech so there were lots and lots of words being typed on the screen, more than I would be able to read at a time, and they were also disappearing faster than I could keep up."*

Further, creating content that everyone could participate in required carefully navigating conflicting access needs. We observed a striking example of this challenge during our virtual scavenger hunt. A2, reflected: *"I spent a considerable amount of time brainstorming multimodal sensory recordings that would be usable by as many people in the group as possible. Recording the ducks (see Figure 1), for example, took over an hour and a half and comprised 37 separate recordings because I needed the ducks to be visible, make a sound, and not have the camera move too much (since a shaky camera phone recording could cause motion sickness)."*

A2's experience sheds light on the care and labor needed to make the content multimodal, so that team members with different sensory disabilities could access them. Several submissions failed to do so (e.g., images or video without alternative text descriptions, audio without captions). Many team members, however, did not submit any content, because *"they felt that they (submissions) had to be completely accessible or [participants should] not participate at all"* (A5). Thus, further support beyond preconceived norms may be needed to ensure universal access, especially in mixed-ability virtual experiences.

6.5 Allyship

Allyship was key for gaining access and feeling supported in lapses in The Team Name and company-wide events in following accessibility guidelines. Being fully online provided a unique new channel for allyship: back channeling via text messaging. Allies harnessed both the group chat channel associated with each meeting and direct messaging channels for allyship, allowing allies to explicitly or implicitly call out inaccessible practices. For example, as stated earlier, M1 and other team members throughout the summer used the chat to remind people to say their names before speaking– an explicit reminder. The chat could also be used to mitigate accessibility issues and share implicit reminders.

Fig. 1. A frame of A2 's multimodal scavenger hunt submission. The video captured the ducks swimming and quacking.

For example: M2 : *"when the work anniversary video was being played without description, an intern quickly wrote down a short description of the video on chat. She wrote, "alt: pictures from M's friends. ranging from Mt. St. Helens to Texas, pictures of M and his spouse hiking, thank you's from [team members] saying how much they love the hikes he suggested." Six team members 'loved' this message and two others 'liked', including one of our interns who is blind. I think it was a very thoughtful and nice gesture from the intern who proactively provided this alt-text."* This method of making up for omitted alt text in the chat was a reasonable, in-the-moment solution [24]. However, splitting a user's attention between the video and the chat is not ideal. Therefore, the public meeting chat was a way to mitigate accessibility issues, but was no replacement for prepared, accessible content.

Power dynamics seemed to influence allyship, as more senior team members often had less visibility into discussions about need and allyship. In contrast, most interns regularly engaged in intimate discussions on these topics. M5 commented on the connectedness that naturally formed among the interns this summer: M5 : *"I was impressed how tightly connected the interns seem to be, sharing info more efficiently and tightly than expected–my intern mentioned getting notified about a topic of interest that caused her to join a coffee chat even on her day off."*

While these self-organizing social networks are effective in providing support, it likely also hindered allyship from more senior team members due to reduced visibility of access labor. We suspect this difference in experiences between full time employees and interns could be due to several factors. First, power dynamics cause tensions between mentors and interns when providing allyship, as M4 described earlier when she tried to strike a balance between being an ally and not being over-eager. Second, power dynamics often affected the type of information that was conveyed in conversations. For example, one disabled intern, M1 , grew to be close friends with one of the interns this summer, P1 . Because of their connection and frequent communication, M1 shared her daily accessibility issues with P1 . In turn, P1 became a strong ally for M1 ; she would speak up about aspects of events that were problematic for M1 when M1 felt too shy or bothersome to say them herself.

On the other hand, M1 did not message her manager or other senior team members regularly, and therefore didn't build this same level of connection with them. Thus, she would not tell them about the frequent day-to-day inaccessibilities, so, they were not privy to her daily challenges. As M5 noted: *"I think I only became aware of M1 's sensitivity to motion in*

videos because of the multi-modal scavenger hunt, which is well into the summer season, and if I wasn't consciously aware of it, I wouldn't have known to need to warn about potential motion sensitivity." Without hearing about the inaccessibilities M1 faced or seeing the effects of triggered motion sickness, M5 was, in a way, excluded in performing effective allyship for M1 .

7 DISCUSSION

Recent accessibility work has began to explore the complexities surrounding a virtual meeting involving people with disabilities [10, 25, 46], however, this work investigated disabilities in isolation. We reflect on themes arising from our unique setting of multiple with varying abilities involved in a virtual summer internship. Our work joins that of others who call attention to the ways *access is created by establishing group norms* [2, 9, 24, 25, 48]. Furthermore, our reflections revealed that the community's ability and commitment to adhere to these norms determined how supported disabled interns felt and how effectively they could engage with the work content. We then discuss how the *invisibility of access labor and disability* could be beneficial or harmful to an individual depending on their desire to disclose their disability. Finally, we discuss how *attitudes* towards accessibility and accommodations norms could impact the success of accommodations.

7.1 Community norm making

In this section, we dive into the mechanics of our groups' norms and the accommodations requested to understand why we, members of the accessibility research group, still struggled to reach full accessibility.

7.1.1 Norm Selection. The formation of community accommodation norms (i.e., those norms that strengthen accessibility) were crafted according to the individual needs of each disabled intern. Due to the individualized nature in selecting the norms, the group's norms changed as the summer went on since interns started on different dates.

Due to the sudden global pandemic, the team needed to choose how and which norms from in-person interactions to translate to a virtual setting. Some common in-person accessibility norms (e.g., speaking clearly for an interpreter) were adopted in a virtual space without much alteration. Other norms became unnecessary in a virtual setting. For example, a common norm is to not touch a disabled person without their permission. This norm of no physical contact was inherently satisfied by the virtual context.

In other cases, norms were not translated to a virtual space which caused inequity or confusion. For example, a common norm shared with groups working with signing d/Deaf individuals is to speak to and look at the d/Deaf person, not their interpreter. The in-person norms required adaptations, as verbally communicating interpreters' videos were prioritized over d/Deaf signers'. However, this issue was not identified until the internship began and was not addressed until weeks later.

Recommendations: Reflecting on our experience, we imagine and discuss a different, more effective model for generating community norms. Rather than making norms individually, we recommend holding a team discussion to establish norms *collectively* and *holistically* as a community. In such a model, all of the access needs of team members can be viewed at once. This structure allows for a more holistic approach of norm creation rather than siloing the accommodations for each individual, and could help avoid accommodations conflicts. Additionally, drawing from interdependent models of communities [2, 22], this process could lead to more accommodations with benefits for multiple people, including those without disabilities in the team. As Sins Invalid notes: "Everyone has access needs, and they can be talked about without shame."

14

It is important to note that there are a few factors that complicate this process of community norm formation. First, to have a community discussion including nondisabled and disabled team members about their needs, in its simplest form, requires a level of vulnerability [7, 43]. Team members need to feel comfortable sharing about their needs to allow for the co-creation of norms. Not all disabled people work in places where they would feel safe or comfortable doing so. One way to mitigate this issue could be to encourage all group members, regardless of disability status. For example, a team member who is also a parent might ask that meetings not be held earlier than 10 AM to allow for school preparation. This norm not only might benefit other disabled team members (e.g., people with fatigue-related disabilities), but it also normalizes asking for changes.

The second way in which this community-based norm creation process can be complicated is due to changes in group members and group membership. This summer, for example, new interns with new needs joined nearly every week the first month. We suggest that communities develop a regularly scheduled time to review and adjust the norms of a community. This not only facilitates the onboarding of new group members, but it also benefits people whose needs may change over time. For example, M1 's motion sickness developed quite suddenly one summer and her fatigue levels changed rapidly. A regularly scheduled review of the norms means there is an established pathway for her to request changes to norms, which can be more comfortable than instigating a review-of-norms herself.

Our final recommendation about norm selection is specific to norm formation when switching to a new context (e.g., virtual) or group dynamic. We suggest that in the norm selection phases when shifting to a new context, groups explicitly consider both how norms from the prior context might be transferred over and what new norms are needed. This time can also be used to reflect on if access needs that weren't being met in person can be addressed more successfully in virtual spaces.

7.1.2 Norm sharing and teaching. Norms were shared and explained to team members via an emailed list, grouped by disability. Little to no discussion in meetings accompanied these guidelines. This form factor may have led to ineffective adoption of the norms for a few reasons. First, the *list was updated* as interns with new needs arrived without much announcement. Therefore, it was easy to skim the list and not internalize the new norms or otherwise miss updates. Second, the list was organized by disability. The norms specific to presentations were scattered throughout disability-specific items, and therefore one had to read the entire list even though some accommodations did not apply to the context at hand.

Finally, the list *omitted background information*, for example, explaining how interpreters are used or how a screen reader is used. We expect that the requester assumed that this information was known by the team, perhaps due to the team's focus on accessibility research. However, our experience highlights that new team members can join at any time, and a comprehensive background in accessibility cannot be assumed. For example, M5 realized that he had not consistently carried out the norm of announcing his name before speaking, since he mistakenly assumed that it was unnecessary as people got familiar with each other through the conversation. Without understanding the rationale that those who are DHH are perceiving conversations (through signs or captions) that do not afford familiarity over time, he was not consistently executing the norm in an effective way.

Recommendations: After reflecting on our experience, we discussed the ways in which norms could have been communicated more clearly and effectively.

First, a list grouped by accommodation *context* rather than disability can make the accommodations more actionable. For example, our accommodations this summer could have been grouped into "conversational norms" and "slide deck norms." Thus, before one joins a meeting, they are met with a checklist rather than paragraphs from which to extract

accommodations relevant to the meeting. Relatedly, updates to the list should be announced in synchronous meetings, if possible, to ensure that the community is aware of new changes.

Second, to avoid assuming background knowledge of meeting attendees, make a concise list of basic accessibility background for the disabilities present in the group (e.g., what is a visual interpreter), with links to more detailed resources. If possible, list the rationale behind why each norm is needed. An explanation can help people understand how to implement the norm more effectively. This list benefits existing group members, new group members (e.g., interns), and short-term guests to the community (e.g., guest speakers). When there is a large group of new community members, like a group of interns, going over this information synchronously can help ensure understanding, while also establishing accessibility as an important group value.

7.1.3 Norm execution and accountability. There were three main aspects of our summer meetings that affected the norm execution and accountability. First, as the list of accommodations grew, *it became harder and more time consuming* for team members to ensure that they followed each accommodation listed. Particularly for conversational norms, team members found it challenging to remember to follow the accommodations every time they spoke. The real-time nature of live meetings does not easily support multitasking (i.e. engaging with accessibility guidelines and conversation simultaneously), or allow much time for corrections.

Second, accommodations were *implemented only when the person who the group viewed as needing the accommodations was present.* For example, M2 and M1 noticed that the norms were followed less strictly in intern lunch meetings with a few people than team meetings. This system of norm execution solely in the presence of a disabled person was problematic for a few reasons. This system makes it difficult to accommodate everyone, in particular people with invisible disabilities who choose not to disclose their disability identity [7, 14]. Additionally, this process led to norms being applied intermittently, which makes it harder for new norms to become habitual.

Finally, we had no established method for correcting people when they failed to follow norms. In a group where members had a wide range of seniority levels, it became uncomfortable for those with less power to correct those with more power [2, 9]. In our results, we discuss how this led to tensions within intern allies between wanting to call out inaccessibility while also wanting to impress (and not aggravate) full time researchers on the team.

Recommendations: We identify social and technology based interventions that can improve norm execution and accountability.

Regarding social-based interventions, we suggest that, when possible, the community norms be applied during all team meetings, regardless of who is in attendance. Consistent application helps habituate the behaviors and allows disabled participants to experience their accommodations without needing to disclose their disability status. Second, we suggest that the community establish norms around how to correct people who break a norm that everyone, regardless of seniority, is encouraged to follow, which may mitigate tensions due to power differentials. Alternatively, having an anonymous way to comment or correct may be valuable (e.g., being able to write text to the group meeting chat as an anonymous participant), as it removes concerns about power dynamics.

Finally, we acknowledge the space for technical contributions in upholding access norms in a virtual setting. Part of the reason for the accessibility failures that we saw were because it is a hard problem; remembering different needs in different settings is challenging. Therefore, technologically enforced reminders of norms help improve adherence. At the same time, a system that does this task well can shift the access labor from group members with disabilities or their allies to itself.

7.2 Invisibility

Being fully remote caused certain aspects of disabilities and accessibility to become invisible. Specifically, we discuss the challenges that were introduced due to the invisibility of access labor, accommodations, and the effects of inaccessibilities in remote settings.

The access labor that people performed tended to be hidden [5, 42] in the virtual setting, making it challenging for allies and team members to understand the scope of the accommodations. For example, in order for M3 to give a presentation to the team, he needed to join the main meeting video call, share his screen (which took up most of his screen real estate), and join another video call to be in communication with his captioner. The other team members were unaware of the complex set up to receive captions, which also splits the user's attention. Consequently, team members were unaware of how to catch M3 's attention when he was on mute (e.g. see Vignettes). This considerable access labor in a virtual setting led to M3 's hesitation to join company-wide intern events, while his allies were unaware that his lack of attendance was due to access challenges. More generally, allies for people with disabilities may have a harder time bearing some of the access labor when they are not co-located with the person with a disability.

Similarly, the effects of inaccessibilities could be easily hidden from other team members. In an extreme example, M1 would turn her camera off if she became physically ill from her motion sickness being triggered on video calls. Relatedly, A4 noted that he left a meeting due to feeling overwhelmed from too many audio streams. While a person physically leaving a team meeting in person is hard to miss, one person dropping from the list of audience members in video calls might easily go unnoticed. The hidden nature of many of the consequences of inaccessibilities made it more challenging for allies to identify inaccessible situations. Consequently, allyship was forced to be more proactive in virtual settings. For example, after hearing M1 's situation, P1 was proactive in reaching out to M1 to provide support.

Finally, the virtual setting made the distinction of accommodations and who received them murky, particularly in the case of ASL interpreters. It was unclear in some meetings, especially if one was not looking at the meeting, which meeting members were interpreters and for whom they were interpreting. A3 , M2 and A2 commented that they were unclear of the interpreter's role (i.e., not a team member) and who the interpreter was interpreting for. M5 noted this was especially confusing when the perceived gender of the interpreter for one male colleague changed mid meeting.

Recommendations: Because the virtual context makes key aspects of disability and accessibility hidden, we suggest a few tips for allies to help improve accessibility. First, we suggest creating ways of making access needs and accommodation use more explicit in virtual settings. For example, developing methods for linking interpreters or other accessibility support members to the person they work with. Both high and low tech solutions can help improve visibility; interpreters can preface their name on the video call with "[name]'s interpreter". Additionally, when a person is using an interpreter, participants sharing their name before their thoughts can help reinforce this connection to who is communicating, which is helpful in large groups [25]. From a more high-tech perspective, an ideal solution would be for an interpreter's voice to be linked to the Deaf signer's video. For example, when A1signed and his interpreter spoke, the software could recognize the signer and the role of the interpreter and show only A1's video. Second, we suggest that disabled members who are comfortable to share how they engage in meetings. For example, M3 could explain his complex setup or simply state "if you need to reach out to me, reach out via a text message." Ideally, as video conferencing platforms evolve, they will build accessibility features into the platform, thus decreasing the access burden for the disabled participant.

Allyship also became more difficult in a virtual setting due to the invisibility of access labor and the effects of inaccessibilities in virtual meetings. We suggest that allies take a proactive approach in providing support [18], without

being overwhelming. Similarly, it can be harder to identify if a disabled person is experiencing inaccessibility (e.g., if M1 's motion sickness is triggered). Reaching out to disabled team members regularly, even if nothing seems wrong, may be appreciated. Unprompted access check-in's are even more critical for mentors to do with their mentees, as our experiences highlight the natural team and power dynamics that may make it more difficult for interns to share access issues with their managers.

Additionally, our work demonstrated a new communication channel available to allies because of the virtual setting: back channeling. This affordance may allow for more effective allyship in some cases. For example, M4 felt a tension around when she should speak up for her mentee. An established back channel could allow her to ask her intern with a disability if he wants her to speak up instead of assuming that help is needed [8, 20]. On the other hand, use of back-channels for allyship has the disadvantage of making ally work invisible. Team members should initiate conversations around if and when it is appropriate to make visible accessibility issues and/or allyship.

7.3 Attitudes towards accessibility

As mentioned by M2 and M4 , The Team Name had a positive attitude towards accessibility and making the team more inclusive. However, sometimes we still made mistakes; being fully accessible and equitable to people with a diverse set of abilities is complex. We now reflect on areas in which our positive attitudes towards access were beneficial and situations where a shift in attitude may have been useful.

7.3.1 Attitudes when norms are not followed. In moments where norms were not followed this summer, authors expressed tensions between wanting to support their disabled team members, but not wanting to call out team members. Note that M1 , in particular, used the words "calling out;" this phrasing carries an undertone of attributing blame to a person.

Recommendations: Reflecting on this mindset, we consider the effects of changing "calling out" to "reminding". Reminding someone of norms assumes the best of their intentions (i.e., they want to be accessible, but struggle with remembering). Therefore, when someone is reminded that they did not follow a norm, it may be better received and imply less "blame" for the person who made the mistake. Explicitly acknowledging a group norm that anyone has permission to remind other group members about accessibility norms, regardless of seniority, would help establish this mindset. Though simple, this change in mindset could lead to more positive experiences when norms are not followed and reaffirm the team's goal of inclusivity.

7.3.2 Attitudes when norms have not been made. Regardless of how well a community plans when creating their access norms, they will often still encounter novel situations where norms do not apply. For example, during our team morale event, we quickly discovered inaccessible situations which we had not (e.g., virtually "passing" a ball). As M5reflected, it was both "awkward" and delayed the activity.

Upon discussion, we identified potential reasons for why people adopted the attitudes they did. First, there were several factors that may have contributed to the "awkward" feelings. Ball passing was a new type of activity that had never been tested before, and it was executed for the first time with the full Team Name (30 people). There was social pressure to make the activity a seamless experience. This influence may have influenced the reaction to inaccessibilities that we had never encountered before, and therefore had no norms for. The team's reaction was to push through the inaccessibility with little delay: get past the "awkwardness" quickly.

Recommendations: Imagining how to improve interactions where norms do not apply, we suggest pausing when new inaccessibilities are encountered. Instead of viewing situations as "awkward", we suggest adopting a growth

mindset in digging into understanding the inaccessibility. Though this approach does take more time, the team can work together to co-create a solution, which will likely lead to a more equitable experience for the person facing the inaccessibility than an approach of sweeping inaccessibility under the rug.

8   CONCLUSION

Due to the pandemic, our team at Research Org experienced a fully-virtual internship on a team with mixed-abilities. Through our autoethnography, we share our rich, personal experiences and discuss the key features that combined in unique ways to shape the accessibility of our team: virtually induced (in)accessibility, power dynamics, remembering lengthy and conflicting accommodations, and allyship. Finally, we reflect on practices around community norm formation, the invisibility of disability and access labor, and team attitudes, commenting both on successful and unsuccessful approaches. We note that there are several opportunities for technology to support the accessibility of virtual teams. Particularly as video calling and conferencing software are evolving rapidly now due to the pandemic, we ask platforms to build with accessibility in mind, and for scripted plugins to allow for more customized accessibility features.

REFERENCES

[1] Jane Anderson and Frank Douma. 2009. *Telework for Workers with Disabilities Pilot Projects.* Synthesis Report. U.S. Department of Labor, Office of Disability Employment Policy.

[2] Cynthia L. Bennett, Erin Brady, and Stacy M. Branham. 2018. Interdependence As a Frame for Assistive Technology Research and Design. In *Proceedings of the 20th International ACM SIGACCESS Conference on Computers and Accessibility* (Galway, Ireland) *(ASSETS '18).* ACM, New York, NY, USA, 161–173. https://doi.org/10.1145/3234695.3236348

[3] Cynthia L. Bennett, Daniela K. Rosner, and Alex S. Taylor. 2020. The Care Work of Access. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '20).* Association for Computing Machinery, New York, NY, USA, 1–15. https://doi.org/10.1145/3313831.3376568

[4] Nicholas Bloom, James Liang, John Roberts, and Zhichun Jenny Ying. 2015. Does Working from Home Work? Evidence from a Chinese Experiment. *The Quarterly Journal of Economics* 130, 1 (2015), 165–218. https://doi.org/10.1093/qje/qju032

[5] Stacy M. Branham and Shaun K. Kane. 2015. Collaborative Accessibility: How Blind and Sighted Companions Co-Create Accessible Home Spaces. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (Seoul, Republic of Korea) *(CHI '15).* ACM, New York, NY, USA, 2373–2382. https://doi.org/10.1145/2702123.2702511

[6] Prithwiraj Choudhury, Cirrus Foroughi, and Barbara Larson. Forthcoming. Work-From-Anywhere: The Productivity Effects of Geographic Flexibility. *Strategic Management Journal* (Forthcoming), 50 pages.

[7] Rebecca Claire Cory. 2005. *Identity, support and disclosure: Issues facing university students with invisible disabilities.* Ph.D. Dissertation. Syracuse University.

[8] Maitraye Das, Katya Borgos-Rodriguez, and Anne Marie Piper. 2020. Weaving by Touch: A Case Analysis of Accessible Making. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (Honolulu, HI, USA) *(CHI '20).* ACM, New York, NY, USA, 1–15. https://doi.org/10.1145/3313831.3376477

[9] Maitraye Das, Darren Gergle, and Anne Marie Piper. 2019. "It Doesn't Win You Friends": Understanding Accessibility in Collaborative Writing for People with Vision Impairments. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW, Article 191 (Nov. 2019), 26 pages. https://doi.org/10.1145/3359293

[10] Maitraye Das, John Tang, Kathryn E. Ringland, and Anne Marie Piper. 2021. Towards Accessible Remote Work: Understanding Work-from-Home Practices of Neurodivergent Professionals. *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW1, Article 183 (2021). https://doi.org/10.1145/3449282

[11] Audrey Desjardins and Aubree Ball. 2018. Revealing Tensions in Autobiographical Design in HCI. In *Proceedings of the 2018 Designing Interactive Systems Conference (DIS '18).* Association for Computing Machinery, New York, NY, USA, 753–764. https://doi.org/10.1145/3196709.3196781

[12] Margot Duncan. 2004. Autoethnography: Critical appreciation of an emerging art. *International journal of qualitative methods* 3, 4 (2004), 28–39.

[13] Carolyn Ellis and Art Bochner. 2000. Autoethnography, personal narrative, reflexivity: Researcher as subject. (2000).

[14] Heather A. Faucett, Kate E. Ringland, Amanda L. L. Cullen, and Gillian R. Hayes. 2017. (In)Visibility in Disability and Assistive Technology. *ACM Trans. Access. Comput.* 10, 4, Article 14 (Oct. 2017), 17 pages. https://doi.org/10.1145/3132040

[15] Alan Felstead and Golo Henseke. 2017. Assessing the growth of remote working and its consequences for effort, well-being and work-life balance. *New Technology, Work and Employment* 32, 3 (2017), 195–212. https://doi.org/10.1111/ntwe.12097

[16] Centers for Disease Control and Prevention. 2018. *CDC: 1 in 4 US adults live with a disability.* https://www.cdc.gov/media/releases/2018/p0816-disability.html

[17] Cole Gleason, Stephanie Valencia, Lynn Kirabo, Jason Wu, Anhong Guo, Elizabeth Jeanne Carter, Jeffrey Bigham, Cynthia Bennett, and Amy Pavel. 2020. Disability and the COVID-19 Pandemic: Using Twitter to Understand Accessibility during Rapid Societal Transition. In *The 22nd International ACM SIGACCESS Conference on Computers and Accessibility* (Virtual Event, Greece) *(ASSETS '20).* ACM, New York, NY, USA, Article 5, 14 pages. https://doi.org/10.1145/3373625.3417023

[18] Bree Hadley. 2020. Allyship in disability arts: roles, relationships, and practices. *Research In Drama Education: The Journal of Applied Theatre and Performance* 25, 2 (2020), 178–194. https://doi.org/10.1080/13569783.2020.1729716

[19] Jasmine E. Harris. 2020. The Frailty of Disability Rights. *University of Pennsylvania Law Review Online* 169 (2020). https://scholarship.law.upenn.edu/penn_law_review_online/vol169/iss1/3

[20] Megan Hofmann, Devva Kasnitz, Jennifer Mankoff, and Cynthia L Bennett. 2020. Living Disability Theory: Reflections on Access, Research, and Design. In *The 22nd International ACM SIGACCESS Conference on Computers and Accessibility* (Virtual Event, Greece) *(ASSETS '20).* ACM, New York, NY, USA, Article 4, 13 pages. https://doi.org/10.1145/3373625.3416996

[21] Kristina Höök. 2010. Transferring qualities from horseback riding to design. In *Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries (NordiCHI '10).* Association for Computing Machinery, New York, NY, USA, 226–235. https://doi.org/10.1145/1868914.1868943

[22] Sins Invalid. 2019. *Skin, Tooth, and Bone: The Basis of Movement is Our People (2nd ed.).*

[23] Dhruv Jain, Audrey Desjardins, Leah Findlater, and Jon E Froehlich. 2019. Autoethnography of a Hard of Hearing Traveler. In *The 21st International ACM SIGACCESS Conference on Computers and Accessibility.* 236–248.

[24] Dhruv Jain, Venkatesh Potluri, and Ather Sharif. 2020. Navigating Graduate School with a Disability. In *The 22nd International ACM SIGACCESS Conference on Computers and Accessibility* (Virtual Event, Greece) *(ASSETS '20).* Association for Computing Machinery, New York, NY, USA, Article 8, 11 pages. https://doi.org/10.1145/3373625.3416986

[25] Raja S. Kushalnagar and Christian Vogler. 2020. Teleconference Accessibility and Guidelines for Deaf and Hard of Hearing Users. In *The 22nd International ACM SIGACCESS Conference on Computers and Accessibility* (Virtual Event, Greece) *(ASSETS '20).* Association for Computing Machinery, New York, NY, USA, Article 9, 6 pages. https://doi.org/10.1145/3373625.3417299

[26] Maureen A. Linden and Karen Milchus. 2014. Teleworkers with disabilities: Characteristics and accommodation use. *Work* 47 (2014), 473–483. https://doi.org/10.3233/WOR-141834

[27] Andrés Lucero. 2018. Living without a mobile phone: an autoethnography. In *Proceedings of the 2018 Designing Interactive Systems Conference.* 765–776.

[28] Kelly Mack, Emma McDonnell, Dhruv Jain, Lucy Lu Wang, Jon E. Froehlich, and Leah Findlater. 2021. What Do We Mean by "Accessibility Research"? A Literature Survey of Accessibility Papers in CHI and ASSETS from 1994 to 2019. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21).* Association for Computing Machinery, New York, NY, USA. https://doi.org/10.1145/3411764.3445412

[29] David McNaughton, Tracy Rackensperger, Dana Dorn, and Natasha Wilson. 2014. "Home is at work and work is at home": Telework and individuals who use augmentative and alternative communication. *Work* 48 (2014), 117–126. https://doi.org/10.3233/WOR-141860

[30] Nathan W. Moon, Maureen A. Linden, John C. Bricout, and Paul M.A. Baker. 2014. Telework rationale and implementation for people with disabilities: Considerations for employer policymaking. *Work* 48 (2014), 105–115. https://doi.org/10.3233/WOR-131819

[31] Dana L Morella. 2008. *Disability, advocacy and coping: An autoethnography on non-visible disability.* Master's thesis. San Jose State University.

[32] Carman Neustaedter and Phoebe Sengers. 2012. Autobiographical design in HCI research: designing and learning through use-it-yourself. In *Proceedings of the 2012 Designing Interactive Systems Conference (DIS '12).* Association for Computing Machinery, New York, NY, USA, 514–523. https://doi.org/10.1145/2317956.2318034

[33] Kim Parker, Juliana Menasce Horowitz, and Rachel Minkin. 2020. *How the Coronavirus Outbreak Has - and Hasn't - Changed the Way Americans Work.* Synthesis Report. Pew Research Center. https://www.pewresearch.org/social-trends/2020/12/09/how-the-coronavirus-outbreak-has-and-hasnt-changed-the-way-americans-work/

[34] Leah Lakshmi Piepzna-Samarasinha. 2018. *Care work: Dreaming disability justice.* Arsenal pulp press.

[35] Halley Profita, Reem Albaghli, Leah Findlater, Paul Jaeger, and Shaun K. Kane. 2016. The AT Effect: How Disability Affects the Perceived Social Acceptability of Head-Mounted Display Use. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (San Jose, California, USA) *(CHI '16).* Association for Computing Machinery, New York, NY, USA, 4884–4895. https://doi.org/10.1145/2858036.2858130

[36] PwC. [n.d.]. It's time to reimagine where and how work will get done. https://www.pwc.com/us/en/library/covid-19/us-remote-work-survey.html Retrieved March 29, 2021.

[37] Kathryn E. Ringland, Jennifer Nicholas, Rachel Kornfield, Emily G. Lattie, David C. Mohr, and Madhu Reddy. 2019. Understanding Mental Ill-Health as Psychosocial Disability: Implications for Assistive Technology. In *The 21st International ACM SIGACCESS Conference on Computers and Accessibility* (Pittsburgh, PA, USA) *(ASSETS '19).* Association for Computing Machinery, New York, NY, USA, 156–170. https://doi.org/10.1145/3308561.3353785

[38] Advait Sarkar, Sean Rintel, Damian Borowiec, Rachel Bergmann, Sharon Gillett, Danielle Bragg, Nancy Baym, and Abigail Sellen. 2021. The promise and peril of parallel chat in video meetings for work. (2021).

[39] Ulrike Schultze. 2000. A confessional account of an ethnography about knowledge work. *MIS quarterly* (2000), 3–41.

[40] Lisa A. Schur, Mason Ameri, and Douglas Kruse. 2020. Telework After COVID: A "Silver Lining" for Workers with Disabilities? *Journal of Occupational Rehabilitation* 30 (2020), 521–536. https://doi.org/10.1007/s10926-020-09936-5

[41] Phoebe Sengers. 2011. What I learned on Change Islands: reflections on IT and pace of life. (2011). https://doi.org/10.1145/1925820.1925830

[42] Kristen Shinohara, Michael McQuaid, and Nayeri Jacobo. 2021. The Burden of Survival: How Doctoral Students in Computing Bridge the Chasm of Inaccessibility. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (CHI '21)*. Association for Computing Machinery, New York, NY, USA, 1–20. https://doi.org/10.1145/3411764.3445277

[43] Kristen Shinohara and Jacob O. Wobbrock. 2016. Self-Conscious or Self-Confident? A Diary Study Conceptualizing the Social Accessibility of Assistive Technology. *ACM Trans. Access. Comput.* 8, 2, Article 5 (Jan. 2016), 31 pages. https://doi.org/10.1145/2827857

[44] Kate Stephens, Matthew Butler, Leona M Holloway, Cagatay Goncu, and Kim G Marriott. 2020. Smooth Sailing? Autoethnography of Recreational Travel by a Blind Person. In *The 22nd International ACM SIGACCESS Conference on Computers and Accessibility* (Virtual Event, Greece) *(ASSETS '20)*. ACM, New York, NY, USA. https://doi.org/10.1145/3373625.3417011

[45] Kevin M. Storer and Stacy M. Branham. 2019. "That's the Way Sighted People Do It": What Blind Parents Can Teach Technology Designers About Co-Reading with Children. In *Proceedings of the 2019 on Designing Interactive Systems Conference* (San Diego, CA, USA) *(DIS '19)*. ACM, New York, NY, USA, 385–398. https://doi.org/10.1145/3322276.3322374

[46] John C. Tang. 2021. Understanding the Telework Experience of People with Disabilities. *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW1, Article 30 (2021). https://doi.org/10.1145/3449104

[47] Anja Thieme, Cynthia L. Bennett, Cecily Morrison, Edward Cutrell, and Alex S. Taylor. 2018. "I Can Do Everything but See!" – How People with Vision Impairments Negotiate Their Abilities in Social Contexts. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada) *(CHI '18)*. ACM, New York, NY, USA, Article 203, 14 pages. https://doi.org/10.1145/3173574.3173777

[48] Anja Thieme, Cecily Morrison, Nicolas Villar, Martin Grayson, and Siân Lindley. 2017. Enabling Collaboration in Learning Computer Programing Inclusive of Children with Vision Impairments. In *Proceedings of the 2017 Conference on Designing Interactive Systems* (Edinburgh, United Kingdom) *(DIS '17)*. ACM, New York, NY, USA, 739–752. https://doi.org/10.1145/3064663.3064689

[49] Brandy L. Wagstaff and Jacob Quasius. [n.d.]. The ADA, Telework, and the Post-Pandemic Workplace. https://www.theregreview.org/2020/09/07/wagstaff-quasius-ada-telework-post-pandemic-workplace/ Retrieved March 29, 2021.

[50] Emily Q. Wang and Anne Marie Piper. 2018. Accessibility in Action: Co-Located Collaboration Among Deaf and Hearing Professionals. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW, Article 180 (November 2018), 25 pages. https://doi.org/10.1145/3274449

[51] Michele A. Williams, Caroline Galbraith, Shaun K. Kane, and Amy Hurst. 2014. "Just Let the Cane Hit It": How the Blind and Sighted See Navigation Differently. In *Proceedings of the 16th International ACM SIGACCESS Conference on Computers & Accessibility* (Rochester, New York, USA) *(ASSETS '14)*. ACM, New York, NY, USA, 217–224. https://doi.org/10.1145/2661334.2661380

[52] Chien Wen Yuan, Benjamin V. Hanrahan, Sooyeon Lee, Mary Beth Rosson, and John M. Carroll. 2017. "I Didn't Know That You Knew I Knew": Collaborative Shopping Practices Between People with Visual Impairment and People with Vision. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW, Article 118 (December 2017), 18 pages. https://doi.org/10.1145/3134753

[53] Annuska Zolyomi, Andrew Begel, Jennifer Frances Waldern, John Tang, Michael Barnett, Edward Cutrell, Daniel McDuff, Sean Andrist, and Meredith Ringel Morris. 2019. Managing Stress: The Needs of Autistic Adults in Video Calling. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW, Article 134 (Nov. 2019), 29 pages. https://doi.org/10.1145/3359236

[54] Annuska Zolyomi, Anne Spencer Ross, Arpita Bhattacharya, Lauren Milne, and Sean Munson. 2018. Values, Identity, and Social Translucence: Neurodiverse Student Teams in Higher Education. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada) *(CHI '18)*. ACM, New York, NY, USA, Article 499, 13 pages. https://doi.org/10.1145/3173574.3174073