Together in the Mikrokosmos: Exploring Disabled Embodied Experiences in Designed Sociotechnical Worlds

KATHRYN E. RINGLAND, University of California, Santa Cruz, USA
ELIN CARSTENSDOTTIR, University of California, Santa Cruz, USA
MATTHEW TUNG, University of California, Santa Cruz, USA
BHAVANI SEETHARAMAN, University of California, Santa Cruz, USA
TESSA EAGLE, University of California, Santa Cruz, USA
LEYA BREANNA BALTAXE-ADMONY , University of California, Santa Cruz, USA
KEVIN WEATHERWAX, University of California, Santa Cruz, USA

For geographically dispersed communities, including professional, academic, hobbyist, and fandom communities, in-person events and meetups play a crucial role in the function and health of the whole community. Building off prior literature, we take a nuanced look at large scale community events that blend online and offline interactions across digital and physical embodied experiences in order to build understanding of how this knowledge can be leveraged to build more accessible hybrid modalities for community events. Building on this foundation, this paper presents a comprehensive study using ethnographic methods to examine large scale community events, specifically stadium music concerts of varying modalities (e.g., in-person, live-streamed). Using a disability lens, we explore how such community events are experienced and technologically mediated, as well as how the community and individuals design and construct their own sociotechnical worlds across multiple modalities and embodied experiences. By centering the disabled embodied experience, we examine how community members navigate the concert environment, time, and the social experience of concert attendance. Based on our findings, we highlight the nuanced complexities of inclusive community-centered large scale, multi-modal events.

CCS Concepts: • **Human-centered computing** → **Interaction design**; *Accessibility theory, concepts and paradigms*; **Empirical studies in accessibility**; *Empirical studies in collaborative and social computing*.

Additional Key Words and Phrases: Embodied Experience, Disability, Online Communities, Concerts, Live-Streaming, Large-scale Events

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Authors' Contact Information: Kathryn E. Ringland, University of California, Santa Cruz, Santa Cruz, California, USA, kringlan@ucsc.edu; Elin Carstensdottir, University of California, Santa Cruz, Santa Cruz, California, USA, ecarsten@ucsc.edu; Matthew Tung, University of California, Santa Cruz, Santa Cruz, California, USA, matung@ucsc.edu; Bhavani Seetharaman, University of California, Santa Cruz, Santa Cruz, California, USA, bseethar@ucsc.edu; Tessa Eagle, University of California, Santa Cruz, Santa Cruz, California, USA, teagle@ucsc.edu; Leya Breanna Baltaxe-Admony , University of California, Santa Cruz, Santa Cruz, California, USA, bre@ucsc.edu; Kevin Weatherwax, University of California, Santa Cruz, Santa Cruz, California, USA, wax@ucsc.edu.

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1 Introduction

Geographically dispersed communities are ubiquitous in modern day society, including professional, academic, hobbyist, and fandom communities, as well as special interest groups of various kinds. For many of these communities, in-person events and meet-ups play a crucial role in the function and health of the whole community. These in-person events enable a degree of meaning making and perpetuation of cultural norms and identities observed today [19, 36, 54, 70]. Especially for some communities and community members, there is a preference and value for in-person interactions as an enriching means of connection [23, 80]. In addition to this, in-person interaction enables further clarity of community identities (bolstered by online identities) to create pathways to solidarity and reducing isolation and alienation. In-person events function as points of contact for community members to share space, build relationships with each other, reify community identity and culture, build and maintain community identity and sense of belonging, and push the community itself further in various ways [12]. Unfortunately, disabled individuals still struggle to gain access to these in-person events or experience them with the same quality as their non-disabled peers.

While there are clear positives and preference for in-person modalities within many communities, these in-person modalities are not always accessible or viable for all community members that would otherwise wish to participate in larger community events [23, 83]. At various points during the first couple of years of the COVID pandemic, communities turned to fully online and hybrid modalities for various community events such as academic conferences, concerts, meet-ups, and theatre productions [1]. In a sense, non-disabled event-goers were experiencing what the disabled experience of in-person events was like for the first time. In adding modalities, these community events became accessible to groups that would otherwise not have been able to attend in person, including community members that have recently had children, are unable to travel due to restrictions, or disabled and immunocompromised community members, and allowed for broader and more inclusive participation as a result of hybrid formats [23, 60, 100]. However, one of the most significant hurdles in this context is fundamentally practical, in that considerable resources and commitment are needed to conduct a community event in a hybrid format, leading many communities to drop hybrid options for events. As communities return to in-person community events without these hybrid modalities, the inclusivity is diminished and community members, who had access to these events momentarily, are unable to participate once again. What was at one point in time lauded as the "silver lining" of the global catastrophe [69], has since been quickly and *quietly* walked back.

The loss of access to community events can have a range of serious ramifications for both individual community members as well as the community as a whole. For individual members, this can range from being unable to participate meaningfully with the community during high-impact discussions that are community building in nature, to grave, life altering implications such as being unable to engage with a professional community and having to change professions as a result. For the whole community, decreased access can mean a loss of representation and different viewpoints that are vital to ensuring community growth. This can cause increased isolation of sub-groups within the community, which can lead to increased hostility, perceived alienation of groups, and disintegration of community identity and community values. The overall result of limited modalities for community events is reinforcement of systemic oppression towards already oppressed and marginalized classes of individuals who may want to participate in community. In order to avoid this outcome, we must learn from the lessons of our time during the beginnings of the COVID pandemic, when we embraced multiple modalities for community events—increasing access for a range of community members.

To better understand and conceptualize these multiple modalities for community events, we turn our focus to a specific type of community event that draws a large number of community members and can be supported in multiple modalities (*e.g.,* in-person, online, and hybrid): music concerts. Concerts, with their emphasis on a preference for live, in-person experience, are of particular interest because, much like other large-scale community events such as conventions or conferences, fans of musicians come together from often geographically dispersed locations to not only enjoy the musicians' performance(s), but also build connections among one another, experience a shared sense of belonging, and reify community goals and norms with one another.

During these concerts, technology can be leveraged in various ways to support, engage, and accommodate both the larger community audience across the various modalities, as well as the performers in the concerts. In this way, concerts are spaces compromised of the built environment along with technological infrastructure and community-specific culture and social norms. We then can understand concerts through a *social worlds* perspective [99], allowing us to analyze and follow the movement of community members as they traverse the different modalities of concerts fluidly as part of the community's social world. In the context of this work, we define designed worlds as a technologically-mediated space that includes infrastructure to help with meaning-making, separation from the "outside world," and modifiability by individuals in the space. Examples of such spaces range from physical spaces like theme-parks such as Disneyland [4, 9] to digital virtual spaces such as Minecraft [8, 76]. We have seen the repurposing of virtual communities into safe spaces for groups with specific needs such as those seen in HCI research for trans individuals [45] and people of color [82].

By centering the disabled embodied experience in the context of concerts as community events, we examine the nature of participation in the *designed world* that the community event takes place in. Specifically, we view the disabled embodied experience not wholly defined by its obstacles or accessibility issues, but where individuals in the disabled community create spaces of joy and community, flourishing through their own cultural norms and support, as seen in recent works about HCI and BIPOC centered research moving away from damage centred design [96]. However, it is important to note disability is a lived experience that potentially impacts every aspect of an individual's life, so much so that some scholars have called for it to be considered a minority status [62, 76, 87, 88]. Through the lens of the disabled embodied experience, we examine the nature of the designed world of the stadium concert as it relates to its community.

In this work, we present findings from an ongoing ethnographic study of the Korean group BTS (방탄소년단 or Bangtan Soyeondan) and their fan community, ARMY (*i.e.,* Adorable Representative M.C. for Youth). BTS and ARMY[1] are known for their active engagement and interaction on online platforms [71, 77], as well as their large-scale, technologically-mediated concert performances.

As such, BTS concerts as ARMY community events can be considered an effective case study for how hybrid formats can be successfully designed for multi-modal community events. We present the findings from ethnographic participant observation of the Permission to Dance (PTD) series of BTS concerts across multiple modalities (*e.g.,* online, hybrid, and in-person) and survey results from community members who attended in-person concerts in Los Angeles, California in 2021. In particular, we focused on the disabled embodied experience of these various concert modalities to help identify how community members face obstacles and challenges through the various ways concert-goers gain access to the concert as a community experience.

In this study, we identified three themes across the various concert experiences: navigating the concert environment, navigating time, and navigating the social experience. Our contributions

[1]Grammatically, the use of ARMY is unorthodox in English. ARMY can be a collective noun or a singular noun depending on the context (*e.g.,* "ARMY are a community." or "I am an ARMY." or "These ARMYs love BTS.")

are three-fold. First, we expand upon for whom and how sociotechnical worlds are designed and the ways in which community members augment and redesign these spaces to accommodate one another. Second, we enumerate the different factors that further complicate the disabled embodied experience of concert-goers including design of the space, social norms, and the impact of time as a construct. Third, we show how community members adapt their already established communication patterns and channels from online platforms to include in-person communication in order to reinforce existing relationships, establish new ones, and reify community membership. These contributions show the nuanced, complicated considerations that concert-goers must navigate in choosing and attending various concerts and their variety of modalities.

2 Related Work

In this related work section, we will review two key areas: theorizing designed worlds and the disabled embodied experience in CSCW.

2.1 Socio-technical Designed Worlds

The work of this paper builds off scholarship of "social worlds" and "virtual worlds" in CSCW to understand large-scale community events as *designed worlds*. Social worlds allow us to analyze and follow the movement of community members as they traverse the different modalities of concerts fluidly as part of the community's social world [99]. Wolf *et al.* used this concept to describe "Home Worlds" as the social world in which home DIY repair involves not just the infrastructure of the home, but also the social aspects, including YouTube video creators, employees of construction goods shops, and other home repair experts [99]. Similarly, we can understand other worlds, such as "virtual worlds," in a similar sense in that worlds are made up of physical infrastructure, technological components, and the social-cultural landscape. Sicart has defined a world as "an environment in which certain modes of agency shape the experience of being. This multiplicity of worlds as settings for agency should not be new: the world of work is different...from the family world" [86]. As Sicart points out, we all inhabit many different worlds at any given point during our day and throughout our lives. Other HCI scholars have examined worlds through concepts such as "worlding" (*i.e.,* world building through meaning making) [3, 56, 68].

In scholarship, a particular type of world, the "virtual" world, has been held as something that is separate from other types of worlds in which people inhabit. Some scholars treat "virtual" as synonymous with digital or online [7]. Up until recently, before the advent and proliferation of the "metaverse" [101], virtual worlds have been digital online spaces where one or more people may interact with one another and their virtual environment. In previous literature, there has been a general assumption that virtual worlds are roughly equivalent to digital worlds or worlds that exist *only* digitally (*e.g.,* [7, 10, 76]). To help move past this, Boellstorff has created a matrix for helping us think beyond a physical-digital divide [9]. Most notably, Boellstroff argues that a "virtual world" may exist in digital or physical spaces. "Virtual" in "virtual world" does not necessarily denote "digital-ness" but rather "set-aside-ness" or a "designed-ness." A virtual world is a designed technology-mediated place, where technology could range from physical objects (such as costumes or toys) to digital objects (such as digital worlds and avatars).

To expand on this further, in the past, scholars have used "virtual" to mean "enabled by online technologies" [8]. As social connection via online platforms, such as various social media, have become more ubiquitous (and large tech companies compete to establish the 'metaverse'), this definition begins to lose meaning. Looking at past scholarship, the term "virtual world" has been used to define multiplayer game spaces, text-based community environments, or 3-D graphical spaces where people can congregate with digital representations of themselves (*e.g.,* [8, 11, 29, 67, 76]). Virtual worlds have many modalities to them, such as being text-based or having a rich graphical

interface, which points to a blurriness in what we mean by "enabled by online technologies." If virtual worlds consist of embodied placeness, social interactions, and online technological mediation—something one could argue can apply to the world in general—perhaps, then, we have lost some meaning for this idea of "virtual world." For this work, we argue having this distinction between "virtual" world and "real" world, in the sense of digital and physical, is not useful.

In the context of this paper, we understand and frame these "virtual worlds" as part of many designed worlds that can exist in digital spaces, physical spaces, or both digital and physical spaces simultaneously. They are virtual in the sense that they are not quite the "actual world" [8] and are set apart from the day-to-day. They are set-aside spaces that have the potential to become community places where meaning and culture are imbued [48, 76, 77]. More specifically, a designed world is a technologically-mediated space that includes infrastructure to help with meaning-making, separation from the "outside world," and modifiability by individuals in the space. This means that communities inhabiting a space create a community place that members are able to engage in based on specific needs and community identification [44, 48, 76, 77]. Thus, multiple layers of identities can be catered to in these places, beyond just a single identity like an individual's race or disability, that recent HCI research has pointed out limitations for [47].

Designed worlds can come in a variety of forms. A digital world in Minecraft is certainly a designed world. So, too, is the Pasadena Rose Bowl, as cited by Bartle, the designer of the first multi-user dungeon (MUD) [4]. Another example is an amusement park, such as Disneyland, that is specifically designed for people to separate themselves from the day-to-day and enable various different experiences in carefully designed environments. Other designed spaces can include the repurposing of social media platforms to create safe spaces for different communities such as on Twitter/X [44, 57]. As Sicart succinctly explains how game software goes from space to place, "Blizzard might have produced *World of Warcraft*, but it is us, the players, who used that object and turned it into a world" [86]. Therefore, we can also think of other large-scale events such as conferences, conventions, and concerts as designed worlds. Each of these places, as designed worlds, are intentionally designed to offer the potential for place to occur and for mediating social interactions.

2.2 Social Context of Disability, Technology, and the Disabled Embodied Experience

Designed worlds are technologically-mediated with infrastructure that potentially crosses digital and physical spaces. Therefore, it's important to understand how a person traverses and inhabits these spaces-turned-places. In particular in this work, we interrogate the disabled embodied experience and its relationship with designed worlds. The definition of the disabled embodied experience is complicated and nuanced. A number of factors impact the disabled embodied experience including cultural norms and societal expectations [26], the "fit" of the designed environment [39], and the ways disability itself is conceptualized by researchers, designers, and communities [18, 25, 78, 104].

Therefore, place is an important part of the embodied experience, in particular the disabled embodied experience, and, in the designed world, has two meanings. First, the embodied sense of "being in the world" or being "in place" (*e.g.,* having a body and the body being able to interact in that space) [7, 10]. Second, the cultural sense of place as a space that has been given social and cultural meaning by the activities, objects, and people interacting there [48, 76]. So we can consider the embodied experience of a place or world to be a combination of the experience of the body interacting with the world and the social interactions mediated through the body and various

technologies. This is complicated when a body is not found to be 'normative'[2] and, as a consequence, is not included when worlds are being designed [26, 39]. Garland-Thomson referred to the idea of a world not being designed for a non-normative body as "misfitting" [39]. Each designed world may be more or less accommodating for non-normative bodies and, more likely than not, access must be negotiated each time these bodies are inhabiting a particular designed world, especially when the designed world is not made for that body to 'fit' [39, 64, 84, 95]. Therefore, the disabled embodied experience will change from place to place or world to world.

It is these experiences, whether a person has access to a particular environment, that *create* disability. The disabled embodied experience is one that does not exist until the person trying to inhabit a designed world no long has access to some or all of the designed world [39, 41, 76]. Disability, then, "is not simply lodged in the body but created by the social and material conditions that 'dis-able' the full participation of a variety of minds and bodies" [41]. HCI scholars have examined the disabled embodied experience through this concept of worlds in "both a person's body and their environment are constantly in flux, then we can say that a disabled person is not disabled all of the time, but rather, they are disabled by the context (*i.e.,* the world with its objects and the body itself)" [76]. Titchkosky states, "While we all have bodies–bodies that we act, sense, feel, or move in and through–only some bodies, only some of the time and only in some places, are understood as disabled ones" [95].

Echoing calls from other HCI researchers, we want to move away from the idea of disabled spaces requiring the need of *interventions* through technology [98] and instead would aim to focus on the larger sense of joy and community building engaged in by members of the communities [96]. This also means moving away from technology mediated tools for the identification of disability or ailments often useful for the diagnosis of individuals [14–17] and instead focusing on how the community is able to create community *enabled* safe spaces often overlapping between online and physical spaces. Research on the disabled embodied experience can focus on the idea of joy [27, 42, 96]. Research can also focus on the ideas of agency creation through the understanding and expanding of digital communities [33, 82, 96, 98] engaging in broader discourse on larger topics, while also maintaining safe spaces for multiple layers of intersectionality [21, 47].

For disabled individuals, how the body interacts and social engagements will vary depending on how well the world's environment and cultural contexts are shaped for a particular individual. For example, ethnographic work on Autcraft—a Minecraft virtual world community of autistic youth—described how members adapt their own designed world, based on their embodied experiences, across and through "physical, liminal, and virtual spaces" to access, protect, and experience their designed place [76]. In the case of Autcraft, the community members iterated on designs of the platform in order to create a designed world that was accessible to them [79]. Similarly, work conducted by Boellstorff in the virtual world Second Life illustrates the ways in which digital spaces can be creative outlets and social spaces for disabled communities [8, 10]. A documentary about people's experiences in Second Life, including those with disabilities, highlights the importance of these digital spaces for some people, who struggle with access in the physical world [31]. The experience of disability impacts interaction with affordances of the hardware and software but also—and perhaps more importantly—it mediates the way they perceive social interactions, designed world interactions, and made choices regarding self-presentation [18, 75, 89, 91]. When thinking about how individuals engage with online spaces it is important to remember that intersectional

[2]The concept of the "norm" is explored in detail in Disability Studies literature [24, 26, 39]. Words such as "normative" and the "norm" lend to the concept that "implies that the majority of the population must or should somehow be part of the norm. The norm pins down that majority of the population that falls under the arch of the standard bell-shaped curve" [24]. Those who veer too far from the norm might give us concepts such as "deviants" or, in more modern language, "non-normative" individuals, such as those with disabilities [24, 26].

identities also engage within the disabled embodied experience, affecting the ability to engage and participate in community space [47]. However, despite these variations affected by different layered identities, online spaces also allow for a larger dominant cultural discourse and behavior that can highlight and build community spaces [44, 50]. This can further help individuals navigate larger spaces due to further awareness on topics previously unaware through community information dispersal [53], which can also vary extensively based on the size of the online communities and areas of interest [51, 94].

3 Cases: BTS Concerts

In this section, we outline the BTS concerts as sites for the study.

3.1 About the BTS ARMY Community

BTS ARMY is a large, global, diverse fandom [43]. Online, ARMY can be found across all social media platforms. The community is known for its uniqueness in terms of size and activities centered around community activism and charity [58, 77]. As such, the community described in this case study is one that is diverse and from all over the globe. Additionally, the community values creating inclusive environments for community members [77]. For the following case study, BTS ARMY traveled from all over the world to attend these concerts.

3.2 Concert Structure and Format

BTS grew out of the Korean pop (K-pop) genre and, therefore, have similarities with some of the cultural norms and patterns associated with the genre. This includes music concerts that have a well established form, structure, and pattern to any given concert experience [34, 92]. The concerts themselves consist of multiple "acts" broken up by "VCRs," pre-recorded videos that often piece together over the concert to tell a narrative, and which act as intermissions between acts. The standard format of a BTS concert is:

(1) Music videos playing on screens as audience finds their seats
(2) Opening VCR plays to signal start of concert
(3) Opening Act
  (a) Opening Act 1 with music set
  (b) Musicians introduce themselves as a band and then give their names individually
  (c) Continuation of Act 1 with another music set
  (d) Band leaves stage
(4) New VCR plays
(5) Acts 2 - N
  (a) Act begins with music set, musicians will have changed costumes, set also probably changed
  (b) Act is also broken up with "ments" (comments, speeches) from the members of the band
(6) Acts are separated by new VCR
(7) Preparing for the End of the Concert & Final Act
  (a) Near the beginning of the final Act, band will announce the concert is ending "soon"
  (b) The "final song" of the final Act is announced during a final "ment"
  (c) Band bows after "final song" and leaves stage
(8) "Audience Time": audience members are featured on the big screen with their signs and costumes on display
(9) A final VCR plays
(10) Encore

(a) Band returns to stage in street clothing, rather than performance costumes, and sing one or two "encore" songs
(b) Band gives final closing "ment"
(c) Band performs one final song, bows again, and leaves stage slowly with interaction and farewells to audience
(11) Often a light show or fireworks are displayed after the last song of the encore

While there may be some variation to this format, audience members anticipate this pattern is followed [34, 92].

The concept of modern K-pop and the cultural aspects we have come to associate with the genre have been proliferating since the mid-1990s, which includes the style and pattern of K-pop concerts being performed at the time of this writing [59]. Lee writes that K-pop concerts contain five key elements: multi-genre, global, visual, interactive, and technological [59]. Important to this paper, concerts contain music, dance, and art melded together in the performance, with each act of the performance having a specific "stage" with thematic set design, choreography, songs, and interactivity with the audience. Additionally, there is an anticipated high-degree of interactivity both during and outside concerts with fan communities, which are designed to be a community experience. Concerts include call-and-response during particular songs, referred to as "fanchants" where audience members sing or shout during pre-planned parts of a song (usually designated by the musicians) [93]. Fanchants normally consist of words to emphasize, but not necessarily copy, the lyrics, or the musicians' names. The musicians refer to the audience by their fandom name. For example, BTS member Jung Kook said,

> *"We were so happy to perform passionately in front of you, ARMY. You guys are awesome. So awesome. This moment right now is just so precious for me. I'm loving it. I love to see you guys like this. And this is not gonna be the last time. This is never gonna be! You're the reason that I smile everyday. So I hope I am your reason to smile, too. Okay! Stay safe! Stay healthy!"*

during his closing "ment" in the Permission to Dance Concert in Los Vegas on April 16, 2022. Finally, audience members are highlighted during the "audience time" by showcasing individual's concert outfits and signs by displaying them on the large screen above the stage.

There is extensive use of technology during concerts that enhances viewing, increases interaction, or adds to the performances' art. For example, the use of large screens strategically displayed to show close-ups of the artists during key moments for audiences who might be far away from the stage. Lightsticks are a handheld technology that glow in different colors and are linked via Bluetooth to the concert venue. Each musical group has their own version of the lightstick, designed to fit the aesthetic of the band (See Figure 1[3]). When used in coordination during the concert, the audience is able to interact as one "pixel" of light lending to the overall light show [102].

3.3 BTS's Permission to Dance Concert Series (2021 - 2022)

Ethnographic and online survey data were collected during the Permission to Dance (PTD) series of BTS concerts across four different concert event modalities; *an online-only live-streamed concert* in Seoul, South Korea, *online live-streamed concert with an in-person audience* in Los Angeles, CA (LA) and Las Vegas, NV (LV) in the United States of America (USA), *in-person* at the LA concert and LV concert, and at a USA-based *theater streaming a concert with a limited live audience* from Seoul, South Korea. In this ethnographic work, in total, 7 concerts were attended officially via ticket purchase. In addition to these 7 concerts, ethnographic data was also collected through participation in unofficial streams and social media posts for an in-person LA concert, where the

[3] All photographs presented in this work were taken by the first author during their ethnographic fieldwork.

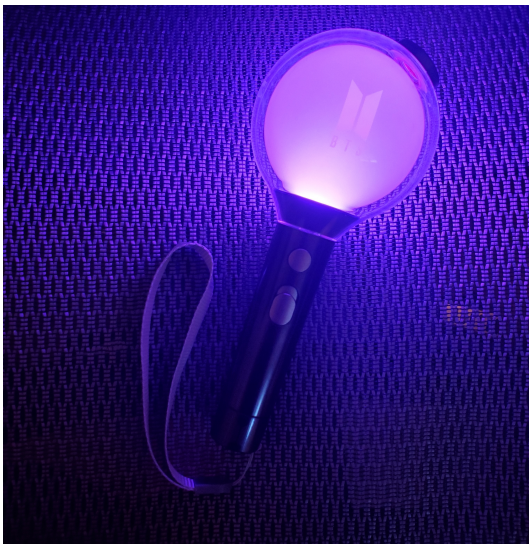


Fig. 1. The ARMY multi-color light stick that syncs via blue tooth during concerts.

Table 1. PTD On Stage Online in Seoul, South Korea

Concert Title:	PTD on Stage
Concert Modality:	Fully remote live-stream, no in-person audience
Venue:	Olympic Stadium, Seoul, Korea
	Live-Stream: VenewLive
Date & Time:	October 24, 2021
	Soundcheck: 15:00 KST (23:00 PST)
	Concert: 18:30 KST (2:30 PST)
Ethnographic Site:	Home Office
Ethnographic Context:	As an ARMY membership holder, the researcher was able to purchase the HD/multiview ticket, which allowed them to pick from 6 different camera views during the concert. The ticket also provided a live stream replay of the concert the following week. The researcher has a computer that can stream HD with high speed fiber internet.

researcher was not in attendance in-person. This was to collect data on experiences and practices of ARMY community members who are unable to afford or access in-person or online modalities, but want to participate in the event. The details of each individual case, including date, modality, venue, and context, can be found in Tables 1 - 6. In addition to the PTD concert series, a number of *ad hoc* concerts are included in the ethnographic fieldwork (See Table 7). These concerts were held informally, usually via unannounced live stream.

Table 2. Case 2. PTD On Stage Live in Los Angeles, CA, USA

Date	November 27 & 28, 2021 19:30 PST
Concert Modality	In-person in Los Angeles, CA at SoFi Stadium Approximately 50,000 concert-goers attended each of the SoFi Stadium concerts.
Venue	SoFi Stadium, Los Angeles, CA, USA
Ethnographic Site	SoFi Stadium, Los Angeles, CA, USA
Ethnographic Context	After failing to purchase tickets through Ticketmaster on the first day of presales, the researcher purchased two tickets for Day 1 (November 27, 2021) through an ARMY friend the researcher knows exclusively through Twitter/X. These seats were directly center stage in the 200-level section. The second day of presale, the researcher was able to purchase two tickets for Day 2 (November 28, 2021). These seats were on the side of the stage in the 300-level section.

Table 3. Case 3. PTD On Stage via Social Media

Date	December 1, 2021 19:30 PST
Concert Modality	Concert was in-person, no official stream, experienced through unofficial streams and social media posts. Day 3 was not live-streamed, thus, the concert could only be experienced through unofficial streams, "fancams" (*i.e.,* videos taken by fans from their phones), photographs, and live social media updates.
Venue	Twitter/X, SoFi Stadium, Los Angeles, CA, USA Unofficial Content: Twitter/X
Ethnographic Site	Home Office
Ethnographic Context	For Day 3 (December 1, 2021), the researcher was not personally attending the concert and there were no official live stream options. However, a number of people were streaming unofficially from the venue and live-tweeting about the event. This was the researcher's fourth PTD concert, therefore, they had a pretty good sense of the setlist and timing of what was happening.

Table 4. Case 4. PTD On Stage Online Official Stream Live

Date	December 2, 2021 19:30 PST
Concert Modality	Official live stream of the in-person concert with in-person audience
Venue	SoFi Stadium, Los Angeles, CA, USA Live-Stream: VenewLive
Ethnographic Site	Living Room at Home
Ethnographic Context	The researcher hosted a small party at their house. The researcher streamed the live concert on their TV with the VenewLive app. Attendees had their ARMY bombs connected via app. The researcher also had Twitter/X on their phone to get updates from people who were in-person in LA.

Table 5. Case 5. PTD On Stage Live in Seoul, South Korea Streamed to Movie Theaters Globally

Date	March 12, 2022 13:30 PST
Concert Modality	In-person in Seoul, South Korea at Seoul Jamsil Olympic Stadium with limited audience (who could use noise-makers but no vocalizations), streamed officially to movie theaters globally
Venue	Cinema in San Jose, CA, USA
Ethnographic Site	Cinema
Ethnographic Context	The researcher purchased tickets for a local movie theater and went with a student who also identifies as ARMY.

During the height of the COVID pandemic (2020-2021), BTS held all of their performances and concerts online in order to adhere to COVID safety protocols. When deemed safe to do so, BTS held 8 in-person concerts in the USA. Across these 8 dates, the concert viewership reached over 1,400,000 individuals either in-person or watching official live streams [66, 103].

Lastly, it is important to note that accessibility accommodations can differ greatly and drastically depending on the venue and venue location. Such accommodations are crucial in considering the social world of large community events, such as concerts, as they dictate and shape the level of participation through access to the physical space. Considering the specifics of a venue's shortcomings can highlight where hybrid modalities could be helpful to community members. The legal responsibility and the manner of implementation of accommodations vary greatly within the USA, and are ultimately the responsibility of the venue itself and its' management, and not the performers. The study presented in this paper focuses on in-person concerts hosted at stadium venues, as is typical of massively popular musical acts such as BTS. The concerts were all held during COVID pandemic restrictions which introduced a host of challenges such as fluctuating

Table 6. Case 6. PTD On Stage Live in Las Vegas, NV, USA

Date	April 15, 2022 19:30 PST
Concert Modality	In-person in Las Vegas, NV at Allegiant Stadium, approximately 50,000 concert-goers attended each of the Allegiant Stadium concerts
Venue	Allegiant Stadium in Las Vegas, NV, USA
Ethnographic Site	Allegiant Stadium in Las Vegas, NV, USA
Ethnographic Context	The researcher purchased ADA accessible tickets through Ticketmaster on the first day of presales. The researcher purchased three tickets for Day 3 (April 14, 2022). These seats were directly center stage in the 200-level section.

Table 7. Case 7. Ad Hoc Concerts

Date	Varied
Concert Modality	Fully remote live-stream
Venue	Studios, bedrooms Live-Stream: VLIVE, YouTube
Ethnographic Site	Home
Ethnographic Context	The researcher has notifications on their phone to alert them when BTS members post or start a live-stream. These often happen in the middle of the night because of the difference between the researcher's timezone and KST.

COVID restrictions and regulations, as well as limitations in choice of stadium venues capable of hosting such events. The authors of this paper, therefore, want to highlight that any issues with accessibility accommodations discussed in the context of this work should not be seen as factors that BTS nor their management had much, if any, control over in organizing the events. Instead, these issues should be seen as potential challenges and hurdles facing attendees of *any* community event of this scale, that requires accessibility accommodations. Additionally, in the USA, under the Americans with Disabilities Act (ADA), it is worth noting that accessibility accommodations are the responsibility of each venue and how venues choose to accommodate disabled audience members varies from place to place [97]. One fairly common systemic issue across stadium venues in the USA is their bare-minimum accommodations.

4 Methods

In this paper, we report the findings from an on-going ethnographic study of the BTS ARMY community. Data were collected primarily via participant observation, which was chosen for the advantage of obtaining rich, thick descriptions of community activities within ARMY [20, 40],

and a survey distributed to the community online via social media. This two-step data collection and analysis process allowed us to use the survey data to both verify and challenge the thematic analysis of the ethnographic data. The first author was responsible for all data collection, as well as primary analysis. Being part of and actively engaging with an ARMY sub-community enabled the first author to distinguish phenomenon that were central to and emerging from within the community. As described throughout this methods section, the researchers in this project take the position that we "stand *within* our research process rather than above, before, or outside it" [20] and, therefore, chose our methods with the intention of elevating the voices of the community of interest while being sure to protect those same voices from harm. In this section, we detail data collection and analysis, as well as researcher positionality, ethics, and limitations of this work.

This work is part of a broader ethnographic project being conducted by the first author within their BTS ARMY sub-community (*e.g.,* [77]). In this paper, autoethnography was chosen as a method for exploring embodiment in social spaces because it connects the societal and experiential to the individual in concrete, conversational terms [8, 35, 73]. Autoethnography has been used increasingly in HCI, particularly in communities of marginalized identities, to surface points of tension in interactions with people and technology and to illuminate how individuals experience sociotechnical interactions firsthand [38, 49, 52, 63]. Autoethnographic methods allow us to engage in deep reflexivity over the topic matter, giving opportunity for new perspectives and tensions to arise [6, 35, 81].

4.1 Data Collection

As part of the ethnography, the primary methods of data collection included participant observation both in-person and online, as well as a survey deployed through social media. We detail these below.

4.1.1 Participant Observation. This paper is based on data collected in the time periods leading up to, during, and after the concerts described in Section 3. Data collected included field notes taken immediately during or after the event, retrospective reflexive writings that encapsulate and interpret the first author's experiences of the events described, social media, photographs and screenshots taken by the first author, and blog posts created by the first author. Additional data, including social media posts created by others in the BTS ARMY community, supplemented the analysis as part of the larger ethnography of the community. The first author's community interactions and experiences were necessarily integral to understanding the concert experience.

4.1.2 Survey. To augment the ethnographic study, we collected data directly from the community. The goal was to gain further insight from the community about a) community connectivity and interaction during the event across modalities, and b) experiences of in-person attendees in interacting with the venue physically, specifically as it related to navigating the venue and experiencing the concert.

Recruitment. The study focused on members of ARMY, specifically requesting participation from members that had attended one of the 4 concerts November 27, 28, December 2, 3, 2021, in-person at SoFi Stadium or in-person live streaming to a theater screen at YouTube Theater in Los Angeles, CA. Participants were required to be 18 years or older to participate in the survey. All participants were anonymous. Participants were recruited through online recruitment using member researchers' ARMY affiliated social media accounts. Participation requests were sent and shared on Twitter/X, Instagram, and 6 community Discord servers.

The survey received 188 responses, of which 152 responses remained after filtering for those who consented, were at least 18 years old, and had attested to attending the PTD Los Angeles concert either at SoFi Stadium or YouTube Theater. Of the 154 respondents, 38 identified as disabled, ages

ranged from 18 - 70 (mean: 37, standard deviation: 11.6 years), 12 identified as non-binary/third gender, 2 provided their own preferred gender identification, and 91 identified as female.

Survey Format. The survey was distributed online using the Qualtrics platform. In the survey, respondents were first asked whether they identified as a member of BTS ARMY and then asked about the specifics of their attendance of one of four BTS LA concerts (i.e. attendance modality and date(s) of attendance). Respondents were then asked if they spent time in-person with any BTS ARMY they only knew from online spaces, followed by an open-ended question to elaborate on any stories about such meetings that they'd like to share, such as the manner of the meet up, what kind of interactions they were, and what had stood out to them. Respondents were likewise asked whether they had arranged to meet online ARMY in person at the concert ahead of time, and again asked to share their experiences through an open-ended question. Then respondents were asked about their comfort levels for meeting other ARMY members in person that they had only met online, whether they had done this previously in other contexts/community events, and whether they had, during the concert, interacted with other ARMY online. Respondents were asked whether their interaction with the community had changed following the concert and how their experiences at the concert would change their interactions going forward.

4.2 Data Analysis

4.2.1 Participant Observation. Data from the first author's field notes, memos, noted quotations, screenshots, photographs, and BTS's posts and videos were all analyzed together during data analysis. The first author used an iterative, inductive approach where emergent phenomena were identified, named, and categorized [20, 22]. Throughout the process of data analysis, the other authors of the paper and members of the first author's ARMY community checked and verified the conclusions being drawn by the first author. During this analysis, the themes of navigating the environment, time, and social experiences emerged. Finally, they reviewed the themes, searching the data for indicators or support for themes and conflicting data that was not well explained by our original interpretation. Additional data from the first author's ethnographic work were used to verify these findings and come to theoretical saturation [20]. This approach was iterative, meaning that they revisited each phase multiple times, as is an established best practice for qualitative data analysis [20, 22].

4.2.2 Survey. After the survey closed, the survey data was processed, and if present all personal identifying information (*e.g.,* personal names, physical location etc.) was removed. The survey responses were then analyzed for the same themes (*i.e.,* navigating the environment, time, and social experiences) found during the analysis of the participant observation data. These data were used to both corroborate and challenge the initial data analysis, further deepening the categories and adding nuance to the findings of this work.

4.3 Positionality, Ethical Approach, & Limitations

The first author of this work, who did the primary ethnographic data collection and analysis, identifies as a member of the BTS ARMY community. The first author is white, primarily English speaking, and identifies as a disabled queer woman. They identify as being neurodivergent and having mobility disabilities that impact their daily life. They have identified as ARMY since the middle of 2020, when they found BTS through a TikTok video. They approach all of their work with a community-centered, critical disability lens. In being within the ARMY community, they think reflexively about concerns of access and justice throughout their interactions and community engagement. They engage with their BTS ARMY community across a variety of social media platforms including Twitter/X, Instagram, TikTok, Tumblr, Discord, and Weverse. They are careful about how

and what data is used as part of their ethnographic fieldwork to avoid bringing unnecessary harm or attention to their community [32, 61, 77].

The other authors of this paper are from a diverse range of backgrounds, including some that identify as members of the ARMY community, while others do not. Some of the authors were present at some of these concerts. The researchers' engagement with the ARMY community follows best practices for working with online communities [32] and specifically best practices for working with the ARMY community [77]. As such, all events and conversations used within this document have been paraphrased to protect the community members' identities. The data presented in these findings are exemplary of the themes found during analysis and were specifically chosen as to not compromise the integrity of the community. These protocols for data collection, analysis, and presentation were informed by the first author's personal experience and also checked with other ARMY on the research team and within the first author's social network. Throughout the research process, the first author, as the primary individual responsible for data collection and analysis, included reflexivity and their own position as a member researcher while writing field notes, memos, and this manuscript, as is standard in ethnographic research [20, 22]. This work aligns with community-based approaches, particularly for marginalized communities, where member checking is used to verify findings and analyses with members of the community [61]. This study was approved by our institution's IRB (#HS-FY2021-5).

Due to the ethnographic nature of this study, there are limits to the generalizability of the findings and conclusions that can be drawn from this work. Given the researchers' Western perspective, primarily English-speaking, and other cultural factors, not all sentiments here will reflect the experience of the community. BTS ARMY as a community is vast and diverse and these data reflect only a subset of BTS ARMY experiences. Additionally, the survey only addresses respondent experiences for the SoFi Stadium and YouTube Theater Permission to Dance concert venues in Los Angeles, CA. This was intentional to capture the challenges and obstacles to the concert experience for concert-goers at those events and highlight the ways in which accessibility is made more obvious by the lack-thereof.

5 Findings

During this study, three main themes emerged: how disabled concert-goers navigate the concert environment, time, and the social environment in order to participate in the various concerts. These three themes highlight the nuanced ways in which disabled concert-goers have to work with and augment their environments and how each member of the community is dependent on one another to participate in these events—from planning concert attendance, experiencing the concert, all the way to the post-concert recovery.

5.1 Navigating the Concert Environment

Each concert, no matter the modality, is mediated by technology, the built environment, and the infrastructure that makes up the community and designed world of the concert. Technology is ever-present in each of the concert events, varying depending on the concert modality. For example, online concerts (See Tables 1, 3, 4, and 7) require a stable internet connection and a device to stream the event. For in-person concerts (See Tables 2 and 6), other technology might include lightsticks that are Bluetooth controlled and timed to the music to light the stadium up in various colors to match the mood (See Figure 1). Concert-goers interact with and use this technology, augmenting their experience and, often, re-design their spaces using the technology at hand. For the disabled concert-goer, in particular, technology is an opportunity for access to the concert experience, but also a potential obstacle when the technology that the concert-goer is reliant upon breaks down. In

this section, we detail how the different concerts require the concert-goer to navigate and augment the environment of the concert world.

Depending on the concert venue, there is a variety of preparations the concert-goer must make before the concert event. The concert-goer must physically prepare, such as traveling to the venue, setting alarms to be awake at the appropriate time, practicing fanchants using websites, or setting up the streaming technology in order to experience the concert. These preparations will be different for each concert-goer, the venue's affordances, and the available technology. In planning for the concert, the preparations for the live stream concert experience is simpler than the in-person concert. For live stream concerts, a concert-goer might use different technological set ups, depending on the venue, such as multiple monitors, TVs, or mobile devices. The following is a reflection of the different configurations used for live-streaming.

> *The most common way I watch live streamed concerts is using dual monitors. For the October concert, for example, I used my office desk with dual monitors to display the concert and my tablet to interact with Twitter. Rather than using the VenewLive in-program chat channel for interacting with audience members, I and my friends use Twitter as an outside platform. This is partly because the single-stream chat channel in VenewLive is very fast moving and has thousands of people, most of which is spamming comments such as all purple heart emoji or written versions of the fanchant of BTS members. Twitter, on the other hand, is filtered and curated based on my own community and personal interests/account. Having multiple devices makes the experience more fun, so I can be on Twitter while also not missing any of the concert. I like having a tablet with a keyboard for being on social media during the live streams because I type faster via keyboard than by phone. Therefore, I use the tablet to stay connected to my social media when I can. (reflection of live-streaming concerts, researcher memo)*

Here, considerations for how to implement different technology for the best concert viewing experience go beyond simply using good technology to watch the concert. The shared, "curated" social experience, as well as the physical comfort of the concert-goer impact the overall experience. The curated community is an important aspect of the concert experience, which we will expand on in Section 5.3. In the following reflection, the memo describes the experience of streaming a concert that was playing live from Seoul, South Korea.

> *I'm ready with the concert pulled up on my larger monitor on my at-home office desk. I should be tired, but I'm not [approximately 2am local time]. I'm buzzing with excitement with whatever BTS have in store for us. This concert is the first of the series, so there's no real clues (other than a few leaks throughout the last couple days) of what is going to be on the set list. Jimin [a member of BTS] has said enough times during interviews that ON [a BTS song] was going to be their opening number. That, and knowing they would play their recent hits like Butter and Permission to Dance (for which the concert is named), the set list is a bit of a mystery. I sit in the dark of my room, headphones over my ears, tablet with keyboard for Twitter propped up next to me, and the concert waiting screen on my bigger monitor. The countdown clock on the screen shows exactly when the concert will start. (October 24, 2021, Permission to Dance On Stage Seoul Concert Live Stream, researcher memo)*

For a live streamed concert, preparing the technology often must come either well ahead or on-the-fly, depending on the situation. For impromptu or *ad hoc* concerts there is no time to prepare the environment. Instead, the concert-goer uses their phone, tablet, or laptop—whatever is more readily available—to pull up the stream to watch when they get the notification. For planned live streamed concerts, the concert-goer might use a more complicated technological set up. These

include using dual monitors, streaming the concert on the TV, and/or viewing on a tablet. Together, these personalized configurations make each concert-goer a designer in the designed world, crafting their own spaces with what is available to them.

> *I received the notification from VLIVE on my phone just before 2am that someone had gone live. From bed, I pulled out my laptop with headphones and opened the link in my web browser. The BTS member who had gone live was Suga with the caption "Long Time No See." The live stream took place from Suga's studio, where he sat on a couch with his guitar. For approximately 37 minutes, he "practiced" the guitar by playing snippets of various songs, many of which were requested via the comment function in the app. He spends time chatting to the camera in between songs and answering questions on the live stream. This is all in Korean and, at the time of the live stream, I did not really understand anything he was saying. I had to go back the next day after subtitles in English had been added to rewatch to understand what he had said. (October 21, 2020, "Long Time No See" Suga Live Stream, researcher memo)*

While points of breakdown readily show where the tensions between people and technology exist (*e.g.,* [30]) these points also serve to illuminate where access for disabled individuals is created. Disabled people are used to having to configure and augment their environment to accommodate themselves (their bodies). How these configurations look depend on the needs of the disabled person and how access was designed for in the first place. There were distinct differences in the embodied experiences that impacted concert-going. The following is a memo reflecting on the different concert modalities.

> *I could control the volume when watching a concert at home, but the in-person concerts were loud. In-person, I could feel the audio vibrations in my body and when the music was playing in the stadium, I could not hear myself talk or sing. The stark difference between the din of being able to scream for real versus the timeline screaming which is aurally silent. For many who had become fans of BTS during the pandemic, the PTD LA concerts were the first in-person event as a community. While we had never been together physically before, we carried over much of our activity that we did online to the offline space. Instead of typing "I am screaming right now," we were actually screaming. (researcher memo)*

In the above memo, we see that being able to control the physical environment is important to many concert-goers. Audio volume control, for example, is crucial for a number of embodied experiences including neurodivergent individuals who find loud sounds overstimulating and painful to those with hearing impairments who might need volume louder or softer.

The venue or platform itself also greatly impacts the amount of preparation a concert-goer must go through and the quality of the experience they end up having.

> *Day 1 there were no staff to assist in line up and the design of the gates don't lend themselves to an obvious way to line up. Gate 10 and Gate 11 lines got merged which created chaos and further delay in entry. There were only 4 metal detectors. To get to the suite we were eventually directed to use elevators that were clearly marked as staff and ADA only. Day 3 was extremely stressful before we got there because of how bad the lines were the first day and what we had seen on Twitter about 2nd day. I was terrified to get stranded after the concert because of the rideshare issues. Although the line was very long already by the time we got there at 3, there were staff directing the line at Gate 12 and early checking vaccination. The line moved fairly quickly once gates opened but they still only had 4 metal detectors and weren't actually checking things as they should. I set off the metal detector because of my ankle braces and they just waived me on. Staff*

> *were helpful directing us down to club level but once we got down there there was no food because all the concessions were closed and staff did not know where to direct us to food. The maps weren't working either. We were finally told that food was on the 6th level by the 5th staff member we asked but we never could figure out how to get there and by the time we had wandered around a while there were lines backing up for the escalators and since there was only one way back down and 4 separate flights of escalators to get there we were afraid we would be late and just gave up on food. We were able to buy a bag of popcorn a guy was randomly selling and that was it... I have been to big area shows and to stadium shows in Chicago and DC and I have never seen the like of poor design, lack of staff, and lack of knowledge from staff. Every other venue that I've been to took security seriously, did it properly, and still moved people through faster. Sofi is beautiful but it is not meant to have people in it. The entire experience was very stressful. - P85, survey respondent, attended SoFi Stadium Day 1 & Day 3, age 46, USA*

The logistical considerations of the concert-going experience become increasingly complicated when the body has to physically move to another location in order to participate. These logistics are made more challenging when navigating a venue that is inaccessible to those with disabilities. Disabled concert-goers must factor in travel logistics (*e.g.,* accessible transportation, risks of various types of transportation), venue access (*e.g.,* physical venue accommodations, how the venue communicates access to the concert-goers), and the emotional cost of traversing unfamiliar, often hostile spaces (*e.g.,* feeling left out, open hostility). These seemingly 'trivial' tasks to some become insurmountable obstacles to others—whether for physical (*e.g.,* fatigue, mobility challenges) or mental (*e.g.,* anxiety, hypersensitivity to sensory input, challenges in executive functioning) reasons.

> *I connected with a few ARMYs on twitter ahead of arriving in LA and after the first day of the concerts had happened who either identify as disabled and/or are advocates for the community. They provided far more information about services and accessibility than SoFi ever did... After the concert my mom expressed that she hadn't requested wheelchair assistance or other accommodation from the venue because she didn't believe they would help her. She spent the entire next day after our concert in bed recovering from the physical exertion...-P30, survey respondent, attended SoFi Stadium Day 2, age 30, USA*

To help mitigate some of the logistical issues of an in-person concert for disabled concert-goers, the first author authored and managed a Twitter/X account[4] specifically for disabled ARMY members to disseminate information, pool resources within the community, and advocate for accommodations for concert-goers[5]. The following is an excerpt from a reflection of how they used this Twitter/X account.

> *As part of my labor under the disabled ARMY account on Twitter, I fielded a lot of questions from people trying to determine if they were eligible for ADA seating. I referred back to the ADA law[6] in most cases, because that was at least slightly more clear than the stadium's accessibility language. (For example, they only cited person's with mobility difficulties specifically on the stadium website and pdf, which is a very narrow representation of those actually eligible for accommodation.)*

[4]For context, one post from this account garnered over 500,000 views during the first day of the Permission to Dance On Stage Los Angeles concerts.

[5]These type of sub-community specific accounts are a common occurrence in the BTS ARMY community, meant to be rallying points owned by community members with expertise, also used to reshare information from other community members.

[6]ADA is the Americans with Disabilities Act [97].

> *Emails, messages, and phone calls to the stadium and Hollywood Parks went generally unanswered. A few people did manage to get a person on the other end, but even then the information was often inaccurate. For example, people received emails informing them they would not be allowed to take their insulin for their diabetes into the stadium and would have to put it in a locker. This is a horrifying (and illegal) policy, if it's true. I have no idea how they actually handled medication onsite. (SoFi Disabled Part 2 Blog, from researcher memo)*

Disabled concert-goers not only need information about the concert—as communicated by BTS and their company—but information about the venue's ingress, egress, and accommodations—as provided by the ticket-sellers and venue. In the case of the PTD in-person concerts (See Tables 2 and 6), there was communication from BTS and their company about the concert, but a lack of information and even confusing misinformation from the venue. The misinformation and multiple versions of information was communicated through the venue's social media, website, and on-site staff. The following excerpt illustrates this for the first day on in-person concerts in Los Angeles, CA.

> *I was with my mother looking for the correct gate to get in line. It was very crowded and there were no signs directing us to where to go. I decided to ask a staff person for directions and waited for the woman in front of me to finish getting assistance. I overheard her asking for the ADA specific line. The staff member told her there was no separate ADA line for disabled concert-goers. I decided to intervene to correct the staff member that, according to their own website, which I had pulled up on my phone (thankfully downloaded because my cell had no internet service at the time), I showed them the language stating that every entrance gate had a separate ADA line. (November 27, 2021, Permission to Dance On Stage Los Angeles, In-person Concert, researcher memo)*

This misinformation and lack of communication is not just upsetting and inconvenient for concert-goers, it can have serious ramifications including potential injury.

> *"I have a mobility device and had a ticket [for an ADA seat], which with an accessibility device the only way to get to was using a wheelchair lift. It took me over 20 minutes to locate this as no one knew where it was and I was being sent to the wrong place over and over again. Finally when I got to the right place the lift needed a special key to get it to work that no one had. It took an additional 45 minutes to find this key. I was incredibly lucky that I entered the stadium early as I could have missed part of the concert. Then at the end of the concert they again couldn't locate the key and I was stuck on the platform for another 45 minutes. It was so cold and I really needed to use the restroom so it was pretty miserable, but the security staff was really kind and kept checking on me and keeping me company so they were trying so hard to help me." - P15, survey respondent, attended SoFi Stadium Day 3, age 36, USA, identifies as disabled*

Not only was physical signage and in-person staff sometimes missing or unreliable, relying on technology became challenging during the in-person concerts because the WiFi and cell service was limited in and around the venue. Maps of the venue via app or website were the only way to navigate the venue as in-person signage was limited and these only worked when there was a working internet connection for most concert-goers. Disabled concert-goers were left to rely on other concert-goers for help navigating and traversing the venue.

In this section, we explored how concert-goers navigate the concert experience, particularly when the environment may not be clearly accessible to them. In every modality, concerts are technologically-mediated across many different technologies—both low and high tech—which creates layers upon which the concert is experienced. Concert-goers use these layers of infrastructure

and technology to help improve access before, during, and after the concert. For example, relying on online networks before and during the concert to prepare and mitigate obstacles when they occur in real time in-person. It is important to note that in addition to these layers of infrastructure and technology, the social aspects of the infrastructure of the *designed world* of the concert had impact. A venue or platform might well be accessible, for example, but if the employees do not know how to manage crowds or direct traffic, the designed world still has break-downs in access. In the next section, we unpack how time is navigated by disabled concert-goers, complicating how they also navigate the built environment.

5.2 Navigating Time

Time is factor during concerts, especially true for disabled concert-goers who already have to factor time—how long something will take, how long it will take to get somewhere, the impacts of time on the body—into their everyday lives. Time impacts access and the experience in several different ways. First, having a synchronous experience is valued within the BTS ARMY community. Second, the amount of time spent and the use of routines and patterns impacts feelings of time during concert activities. Finally, third, the concert experience itself is often experienced in time beyond the actual concert. Anniversaries and other triggers cause reminisces which ripple across the community, often including videos and stories.

During the concert, synchronicity played a key role in the concert-going experience by creating an "in the moment" togetherness of the performers and audience. The synchronous participation deepens the connection between musicians and their audience, making it a more meaningful experience for everyone involved. Members of BTS often lamented not being able to have in-person, co-located concerts during the pandemic. As one of the members, J-Hope, said in an interview, *"I get an energy from those moments that I haven't been able to feel lately"* [85]. During his closing 'ment' on Day 1 of the Permission to Dance concert in Los Angeles, BTS member RM said,

> *"This morning I was on the bus with the brothers coming to rehearsal to SoFi Stadium and I just looked out the window. And the scenery of LA—beautiful town—was just passing by and I just felt so strange because, you know, I just remember the rage, the anger, the anxiety, the desperation for this whole two years [during the COVID-19 pandemic] where we released Dynamite, Life Goes On, Butter, Permission to Dance. I was sad. I was so down. But, as I looked out the window, you know, it felt like nothing. It's so strange. Times moves so fast. I couldn't believe that we're actually...meeting in person, face to face, eye to eye, the real communion that we had for that goddamn seven years. And now here we are...In the bus, I thought...I'm going to definitely miss this moment in my 40s, in my 50s, in my 60s. You guys are the proof of our existence, our value, our breath, our love, our peace, for everything. You guys are our goddamn proof! SO we were the bullet and you guys were our proof. So we're now truly bulletproof. Thank you so much. I love you."*

Time is evoked in many statements by BTS in comments about historical events, the time 'lost' during COVID-19, and in the future of the group and the fandom.

For ARMY, too, being in-person, in real time, was an important aspect of attending a live, synchronous event.

> *"It was surprisingly fun to see ARMY 'celebrities' in real life, like youtubers, journalists, academics, and a certain purple chicken. It made the whole online community feel more real and added to the festival atmosphere." - P39, survey respondent, attended SoFi Stadium Day 4, age 36, USA*

Another survey respondent echoed the benefits of being in-person, in real time, by saying,

> *"i think everyone has more dimensions and depth irl. online we only share one or two parts of our lives. and so much of communication is non verbal, and lost if you only interact online. i think being in person is more intimate, you can hug and hold each other and laugh out loud or scream in unison. that being said the online persona is still there." - P32, survey respondent, attended SoFi Stadium Day 3 & 4, age 30, USA*

The audience is an integral part of the concert experience for both ARMY and BTS. The audience is expected to fully participate throughout the concert. Concert-goers have been incorporated in a variety of ways depending on the concert modality. This includes being physically present, displaying a live stream of a select portion of the audience, and displaying chats during the performance that the BTS members read aloud.

The desire for synchronicity extends to both planned and unplanned events. While ARMY do go back and watch recorded content, there is a perceived value in having "been there" when it happened. Missing an unannounced, informal live stream can be potentially upsetting for many ARMY community members. "Life Goes On[7]" is a phrase that always trends on social media after a live stream as way of providing a consolation for those that missed the event for whatever reason. Many online streamed concert experiences occur in Korean Standard Time, including those organized by community members all over the globe. There are networks and systems in place to help ARMY members alert each other if a member of BTS comes online—even if it happens to be in the middle of the night, which it often is for time zones in the United States.

> *This concert was set in Seoul and, therefore, was at 2:30 am for me. The concert was the same weekend as conference workshops, so I had been working the day before (Saturday) and had another meeting the following morning (Sunday). So, I was forgoing sleep to attend both the soundcheck, which was at 11 pm my time, and the concert. However, everyone else in my Twitter community was also awake and watching the concert, so it was pretty easy for me to stay awake. We were all awake and united in the KST. Technologically speaking, I could have recorded the concert and watched later, but then I would have missed all the "screaming on the timeline" (i.e., the tweets about the concert in real time). (October 24, 2021, Permission to Dance On Stage Seoul Concert Live Stream, researcher memo)*

Being in sync with other concert-goers allowed them to be able to have a shared context while participating in community conversations during events. This was important socially because concert-goers can use shorthand and build off each other's commentary and have conversations quickly together without missing the show. For example, one might tweet, *"Oh I love this song"* without reference to the actual song or *"Wow do you see the lace on his shirt"* at the moment of a costume change.

Synchronicity is also seen in the concert itself when various technologies are incorporated to help augment the experience for concert-goers and performers. In addition to the light sticks held by members of the audience, other technology was employed on stage. Large screens where the performers were live broadcast helped the audience see details of the performers (See Figure 2). For in-person concerts, ARMY will refer to the audience as the "purple ocean" because the entire audience will light up purple (*i.e.,* a color that is significant to ARMY) (See Figure 3). BTS expertly took advantage of these screens to communicate more intimately with the audience of up to 50,000 people. The same screens were employed during the live-stream concert in October, reflected in the following memo.

> *What we see in the Black Swan performance is the magical blending of digital and physical realities. There is the fact that BTS are performing live in a stadium in Seoul,*

[7]This is said tongue-in-cheek, as BTS also has a song titled Life Goes On.



Fig. 2. BTS using a large screen behind the performance to display another viewpoint in order to incorporate BTS member V into the performance when he was unable to participate due to a leg injury.

> *Korea and that is being streamed in real time across the globe. Then within the concert itself, there were large digital screens behind the stage that played different visuals from the performance. Sometimes the main stage was mirrored, enlarged, behind BTS. Other times, V was shown on a large screen behind the other 6 members while they were dancing. This was while he was sitting just off to the side of the main stage [because of a leg injury]. (BTS Online Concert Reflection Blog, from researcher memo)*

In this case, the screen behind the stage was used to project the injured member of BTS while the others completed the planned choreography. The live-stream then captured not only the members dancing on the stage, but the temporarily disabled performer as well.

This synchronicity is revisited by the community long after an event or concert has ended. Community members will often hold "viewing parties" where an older concert is streamed for ARMY to watch together—and chat in real time through social media. It's not uncommon to have a large group of ARMY discussing the viewing of much older content, drawing in newer community members who maybe haven't seen the concert yet, creating a real-time oral history lesson in the form of a fun streamed concert experience.

Especially for the disabled concert-goer, existing only in synchronicity has the potential for harm (other than a lack of sleep and potential feelings of sadness if one missed out). In person, the time it takes to do something impacts planning for the event, the waiting may be physically painful or harmful to the body, and the amount of time required to recover all impact the experience before, during, and after the concert. Disabled concert-goers have to plan for these periods of time as they

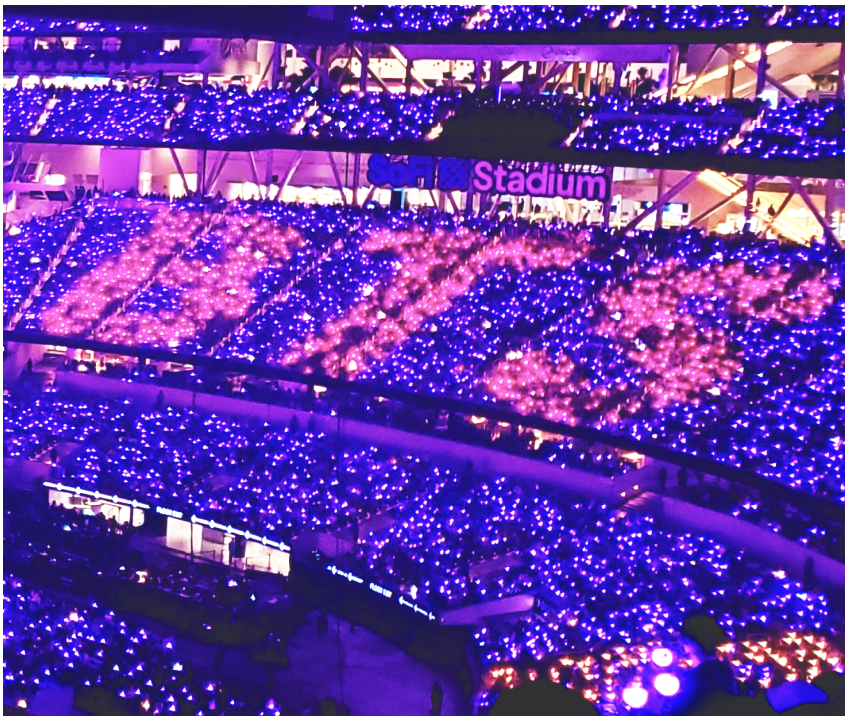


Fig. 3. "The Purple Ocean": The light sticks all glowing purple during an in-person BTS conference, spelling out the band name. Light sticks are one of several technologies incorporated to help augment the experience for concert goers and performers.

prepare for their concert experience. When there is inadequate information, as was true for SoFi Stadium, this preparation was lacking, as the following survey respondent notes,

> *"There was no real understanding of how large the venue was in advance. I wasn't able to be as prepared as I would've liked because many of the staff had no clue. When you are disabled, you plan and unfortunately it took a kind person with connects to help us." - P9, survey respondent, attended SoFi Stadium Days 1 - 4, age 35, USA, identifies as disabled*

Following is a description of the impact of standing for hours on the second day of in-person concerts.

> *After the second day of in-person concerts, we navigated our way through the crowd, to exit the stadium. We walked slowly in lines to get down the stairs, out the doors, and through the now-disarmed metal detectors. We knew the parking lot would be immobile, so I looked for a place to sit. My feet and knees hurt. I knew if I wasn't careful, I was going to start getting muscle cramps in my legs. I found a stair to sit on that was overlooking a water feature. We were out of the main thoroughfare and not in anyone's way who might be trying to exit the venue. Many others were also sitting around us - waiting and resting - preparing for the next phase of leaving the stadium. I snapped a photo of my feet [See Figure 4], for no particular reason, other than wanting to remember I was physically here, in this space. After about five minutes of resting, a security guard came through to tell us brusquely we weren't allowed to sit there and that we needed to leave. "The park is closed." So, we got up to stand in the crowd trying to get to the parking lot. When we eventually*



Fig. 4. Photo of the first author's legs, taken after second in-person concert in Los Angeles, CA (from memo). Attending in-person concerts includes waiting in lines for 3 hours before attending the 2.5 hour long concert. This can be immensely challenging on disabled bodies.

> *made it to the car, I took my boots off and threw them in the trunk. I drove home barefoot, fighting leg cramps the entire 45 minute drive. (November 28, 2021, Permission to Dance On Stage Los Angeles In-person Concert, researcher memo)*

The passage of time is a subjective embodied experience, especially as pain becomes a factor. From the above memo, we see that experiencing waiting in lines for 3 hours felt long. However, the concert experience, which lasted 2.5 hours—almost as long—, seemed to go by very quickly. For the disabled body, the amount of time was all the same. It was just easier to ignore the pain and damage caused when the concert was happening rather than while waiting idly in line. Disabled concert-goers will weigh the benefits of going to a concert with the costs of body recovery time.

> *being disabled with multiple chronic conditions, I know concerts are hard. traveling is hard, sight seeing is hard, just getting around in an unfamiliar area is hard, and I go into them knowing this. knowing that on the other side, when I'm laid up in bed in pain beyond imagining, that it was worth it. BTS and army are so special to me and it is worth destroying my body to do it, because of the happiness and euphoria I get when I see them perform - P124, survey respondent, attended SoFi Stadium Day 3 and YouTube Theater Day 4, age 33, USA, identifies as disabled*

Each concert experience is weighed for the amounts of time 'invested' in attendance, which can vary widely (See Table 8). These segments of time and seemingly 'trivial' tasks compound and impact access to the designed world of each concert. A disabled concert-goer must look at the time it takes and the "spoons" (*i.e.,* energy) required to weigh the costs and benefits of each event [65].

After each concert ending, there is a required "recovery time" that varies depending on how taxing the event has been for the concert-goer and their body. For example, for the first author and the in-person concerts, the recovery time was weeks; whereas for the live stream events, it was in the order of days. This recovery time will become a factor when concert-goers are choosing the modality of concert that is right for them. Some people attended all four days of the concert,

Table 8. An approximation of the amount of time each concert takes varies widely depending on venue and concert modality. Times are approximates.

Time for a home live stream concert:	**Time for an in-person concert:**
Buy and verify the ticket (0.25 hours)	Buying the ticket (6 hours)
Time to set up computer (0.25 hours)	Travel to concert city (8 hours)
Watch concert (2.5 hours)	Getting to the venue (1 hour)
	Waiting to get into the venue once on-site (4 hours)
	Watch concert (3 hours)
	Leave venue and go back to accommodations (3 hours)
Total: 3 hours	**Total: 25 hours**

whereas others might not make it through a single night. Having the option of different modalities significantly increases accessibility of a concert. For the disabled concert-goer, knowing that they can still "be present" even through a live stream and connected to friends via social media, gives them choices about what they might put their body through in order to enjoy the concert.

Beyond recovering, there is time spent reminiscing about the concert after the event. Online, the ARMY community playfully shares stories and media content from the concert [37]. For example, concert-goers edit and upload videos taken during the in-person concerts to share their own view and create various montages of footage from the event. These "fancams" often become beloved pieces of ARMY history, shared and reshared well beyond the original context of the concert. Live stream concerts are often recorded and snippets are shared online, along with various screen shots and associated stories. There is also a pattern and flow to reminiscing as anniversaries or other related events trigger the community to reshare content and stories.

In this section, we expanded upon the ways in which disabled concert-goers navigate time in relation to various concert events. Being synchronous is one such way concert-goers leverage time to improve their concert experience, but, for some, this might also be harmful, depending on the context. Offering multiple modalities for concerts might help to mitigate some of these harms. In the next and final section, we discuss how concert-goers navigate the social experience of concert attendance.

5.3 Navigating the Social Experience

Many ARMY connect with each other through social media, rather than having opportunities to meet in-person, which is especially true for disabled individuals who often must overcome multiple obstacles to venture from their homes and accessible routines [71]. Concerts are a way for ARMY and BTS to come together, giving a festival-like experience for those traveling to the concert city. Therefore, concert-going is inherently a highly social experience. This connection traverses the different spaces the community inhabits online and offline. In this way, the concert as a designed world is directly impacted by the occupants of the space—influenced by the community's culture, norms, and expectations.

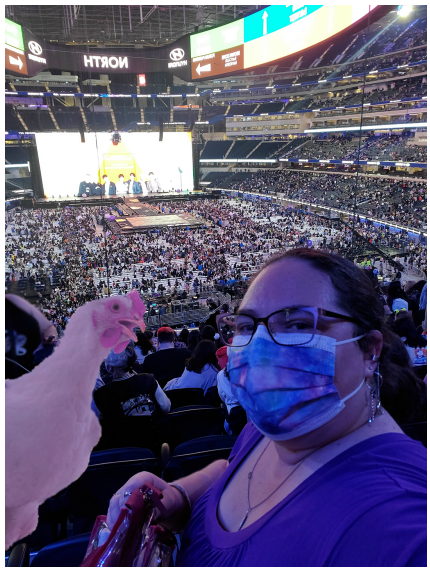


Fig. 5. First author "meeting" a fellow ARMY who cosplays online as a chicken who likes BTS. They had only interacted online until that point. Photo taken at the Sofi Stadium concert with a purple chicken edited into the photo.

One aspect of in-person concerts that many community members relished was the ability to meet friends in the physical world for the first time. Especially for those who joined the community during the pandemic, meeting online friends was an important aspect of the concert-going experience.

> *Meeting Army is always an unforgettable experience that bonds [like] no other. For 2 years we've felt adrift, depressed and alone. But the moment we got into the parking lot and started smiling at and chatting with Army all of that went away. Coming back to BTS and Army always feels like home. Something inside you just lets go. -P24, survey respondent, attended SoFi Stadium Day 2, age 41, USA, identifies as disabled*

In the above quote, P24 emphasizes the importance of coming back together again in-person after having been only connected online for two years because of the COVID pandemic. For some longer-term ARMY members, this was a reunion—meeting those they had met in person before 2020. For others, who joined the community during the COVID pandemic, this was the first time they were meeting other community members in-person. For example, P120 (survey respondent, attended SoFi Stadium Days 1 - 4, age 25, USA) said, *"It was nice to see real people. I started as an ARMY during the beginning of COVID, so I had never been in the presence of other ARMYs before."* P120 also noted this was how they solidified that *"all these accounts are real, actual people."* This also meant meeting up with ARMY community members from specific sub-communities and special interest groups that might be geographically distributed. For example, P9 (survey respondent, attended SoFi Stadium Days 1-4, age 35, USA, identifies as disabled) : *"It was nice to meet other disabled Army and chat about our excitement and fears."* Others, as described below, arranged to meet up with specific "moot" or mutuals from online social media platforms.

> *Before traveling to LA for the PTD concerts, I had messaged a friend I only knew from online about meeting in-person. They run a parody account, cosplaying as a chicken that loves BTS. I had never met them anywhere other than Twitter and, in fact, only knew them*

> *by their Twitter account name. At the concert venue, I was worried we wouldn't be able to meet up because the cell service and wifi were flaky or non-existent. Luckily, I was able to get a Twitter message through to them and we were able to meet up before the show started on Day 2. We hugged and exchanged our photocard gifts that we had prepared for concert-goers. Later, after coming back home from LA, I posted a "selca" with a purple chicken, tagging their account, to say how happy I was that I had gotten to meet them [See Figure 5]. (November 28, 2021, Permission to Dance On Stage Los Angeles In-person Concert, researcher memo)*

In this memo, we can see the blending of social media space and the physical space between communicating on Twitter/X, meeting in person at the venue, and then meeting again online post-concert to relive the concert experience with others.

For others at the in-person concerts, the stress of navigating the venue, especially with missing accommodations, meant that certain concert-goers lose out on social interactions. One concert-goer mentioned they used other venues outside the stadium to make up for this lack of social engagement at the concert:

> *"I didn't interact at the concert because ADA was so lacking and accessibility was my only focus. At the hotel, I met several online friends and further cemented these online relationships" - P47, survey respondent, attended SoFi Stadium Day 3, age 55, USA, identifies as disabled*

The ARMY community as a whole is socially-minded and are known for their activism [71]. Therefore, when ARMY are together in a space, community norms influence prosocial behavior (*e.g.*, being friendly, mask-wearing where appropriate, being orderly). Members of the ARMY community are also aware, because of the size of the community and other societal factors, that their behavior and activities are noticed—and commented upon—by outsiders [77]. This means that ARMY conduct themselves in public spaces in a way that is in line with community culture and also reflects well on BTS. For example, in-person, concert-goers were on Twitter/X reminding and encouraging one another to be respectful of the venue and to take care of one another. This was also reflected in the ways in which community members looked out for one another, both physically and digitally.

> *During the in-person concerts, due to the infrastructure at the stadium, Twitter was the only communication that worked at times (text messages, phone calls, and other messaging services were down). I used my Twitter account to tweet out accessibility information as I learned about it while navigating the stadium. I also used it to report the failures of the venue when they lacked crowd control or ADA accommodations. For example, I created a packing list based off of previous concert-goers' experiences that had been shared with me and communicated prohibited items. The stadium venue shifted their position on certain prohibited items (e.g., sealed water bottles, batteries) multiple times, leading to frustration and a need for me to send out frequent updates on Twitter to alert disabled concert-goers of the changes. The crowd control issues created by staff at Sofi Stadium were also very concerning[8], leading many of us to warn people via social media and then to complain loudly about the venues problems after the event. (researcher memo)*

In this way, concert-goers ended up using their social media accounts to augment the designed world, as we can see in the example above, to create more accessibility for disabled concert-goers. Concerns over safety and wanting to take care of one's community also played big roles in the dissemination of information and in how the community voiced their concerns over the experience

[8]The Permission to Dance on Stage in Los Angeles concerts took place three weeks after the tragic crowd crush accident at Astroworld that led to the deaths of 8 people [46]. Therefore, fear over another such event were heightened during the Los Angeles concerts.

after the concert was over. There is a sentiment among community members that, while bad crowd-management should have been avoidable, they were glad they could trust the BTS ARMY community members.

> *I'm very grateful that armys are for the most part kind and considerate because the crowd/line management was non-existent the first day and completely unhelpful the second day (at least at my gate, Entry 5). I actually have a fear of crowds and knew that BTS/ARMY were the only concert/crowd I would ever attempt alone. It was very, very stressful for me but manageable because of the faith I had/have in BTS & ARMY to conduct ourselves safely and courteously. It also helped that I had no doubt the extra stress/anxiety would be worth it in the end to see BTS, and I was absolutely correct in that assessment!! - P99, survey respondent, attended SoFi Stadium Days 1, 2, 3, & 4, age 41, USA, identifies as disabled*

It is important to note here, also, that the social experience extends beyond the community itself. The staff at each event venue for in-person concerts played a significant role in how each concert-goer experienced the concert. In the above example, staff were unprepared, uninformed, and unintentionally put concert-goers in harm's way. However, at the Permission to Dance on Stage in Las Vegas, the venue and staff were much better prepared for the concert-goers, as illustrated in the following memo.

> *The experience of being in-person was so much smoother at Allegiant Stadium. The lines were well organized, ADA was easy to find and there was no wait, and all the staff were friendly and well-trained. I went with two other ARMY (a family member and someone I had only met online) who required ADA accommodations. We had a blast and never felt "othered" by sitting in the disabled seating section of the stadium. (April 15, 2022, Permission to Dance On Stage Las Vegas In-person Concert, researcher memo)*

The social experience of the concerts is where the easy traversal and incorporation of multiple spaces—online and offline—is most evident. The in-person concert experiences mirrored much of the activities and interactions of online experiences. Both the community norms and predictability allow for concert-goers and performers to anticipate the next activities and engage with one another more meaningfully. When the audience is in the tens of thousands, this sort of predictability helps to manage crowds and allow more people to participate to the fullest.

This predictability and shared experience crossed online and offline spaces. In online spaces, community norms and practices are communicated through various mediums, including text, video, and photographs. When participating on Twitter/X, the written text takes the place of something a physical body might be doing (but most likely is not).

> *Being on Twitter while in the online concerts felt like a natural part of the experience. For me, having that digital presence on social media was just like I would have in a virtual world, my body is less the body sitting at my desk in the middle of the night, but more the body that is occupying my small corner of Twitter. I might be silently watching a concert in the dark of my room—almost like I'm watching a movie—but I'm writing tweets such as "I'm screaming." It feels like role-playing, but the role is myself, who I'd like to really be right now. (October 24, 2021, Permission to Dance On Stage Seoul Concert Live Stream, researcher memo)*

At the in-person events, this also resulted in shared experiences that allowed community members to easily fall into similar relationships and practices that they share in their digital places. For example, the following memo describes how "screaming" silently online translated into real screaming together at the concert venue, even before the musicians were physically on stage.



Fig. 6. A photo taken before the first day of the in-person concert at Sofi Stadium preparing BTS photo card gifts for ARMY in attendance. In-person concert-goers often prepare presents of photocards or other gifts to give away to fellow concert-goers.

> *I was sitting in the designated food area while drinking a bottle of water with a friend I had met at the venue (we had previously only known each other through Twitter and bought concert tickets together). Other groups of concert-goers were also sitting at other tables around us. The music video for Blood, Sweat, and Tears was playing on the large screen in the stadium area. We couldn't see the video clearly, but we could hear the music. When a particular scene from the music video plays, everyone sitting at tables started screaming. The screaming is for the visual being displayed on the screen, but even for those who couldn't see the music video, they knew exactly what part of the song the visual appeared in. Even if we can't see the video, we have a shared memory of the video and can participate in the community experience of that video. (November 28, 2021, Permission to Dance On Stage Los Angeles In-person Concert, researcher memo)*

These two examples above illustrate the ways in which the ARMY community communicates not only what they are thinking or feeling in any given moment, but also *describing* what their bodies are doing (sometimes, what their bodies *could* be doing, or what they *imagine* their bodies to be doing). This leads to the question of *where* do BTS ARMY community members actually exist—a question we will return to in the Discussion section below.

The labor of educating, sharing, gift giving, and activism are all common place in the ARMY community. On social media, this takes the form of fan cams (*i.e.,* videos of the performance taken by fans), gifs, screenshots, pictures, and stories online. In-person concert-goers also prepare presents of photocards (*i.e.,* cards with pictures of the members of BTS) and gifts (*i.e.,* stickers, booklets, notes, candy) to give away to fellow concert-goers (See Figure 6). As the community comes together for concerts, people bond and build relationships. For the in-person concerts, even as some were attending in-person, many people had "attended" unsanctioned live-stream versions of concerts (*i.e.,* via Twitter/X). Again, this mirroring of online and offline activities demonstrates the blending of these designed worlds. One survey respondent noted that despite all the disorganization and stress caused by the SoFi Stadium venue, ARMY still maintained a positive outlook with one another.

> *I thought, what an effect BTS had/have on ARMYs! Nothing could diminish the joy and excitement of seeing and hearing them. Everyone was having fun, forgetting all the annoyance of not finding their seats, staff not knowing which ways to go to certain levels, getting short of breath climbing the stairs to their seats in the nose-bleed sections,*

> *jacked-up prices (Tickets, merch, food), traffic, etc. Every ARMY we encountered was very nice, patient and helpful. Smiles on all their faces and just plain having the best of time! -P 153, survey respondent, attended SoFi Stadium Day 3 & 4, age 70, USA*

> *BTS is of course, incredible. But ARMY is truly worthy of the love and praise the guys [BTS] give us. I have never felt so safe or accepted in a huge crowd. I felt really confident that the people around me would be their best selves, and that people would be kind/courteous. They absolutely were—they were lovely. The aura of the concert on both days was positive and embracing. - P10, survey respondent, attended SoFi Stadium Day 2 & 3, age 38, USA, identifies as disabled*

In this section, we explored how disabled concert-goers navigate the social environment of the concert experience, including within the community (in all the places the community exists, online and offline) and with others within the concert environment such as staff at the venues. The social environment can have a great impact on how accessible and enjoyable a concert experience might be. Additionally, the social environment is deeply intertwined with the concert environment and time, all three of which concert-goers must navigate to attend concerts.

6 Discussion

Community events, such as concerts, represent incredibly complex designed worlds. Our findings show that there are a large number of complex considerations that concert-goers, particularly disabled ones, need to take into account to attend, technologically augment, and manage their concert experience, regardless of modality. Through a lens of the disabled embodied experience, this study is focused on capturing the broad set of considerations and issues that enable these processes for music concerts to explore where issues such as accessibility challenges and bottlenecks appear in relation to large scale, technologically mediated community events. Specifically, the intention is to highlight and inspire more in-depth and nuanced exploration of such designed worlds, with the goal of building better accessible, technologically mediated, hybrid modalities for communities to come together.

In exploring the disabled embodied experience in the various concert modalities, areas of further inquiry emerge. First, who and how sociotechnical worlds are designed impacts the experience of marginalized individuals, but, more importantly, how the community works to redesign their space to accommodate community members, in turn, shapes how these worlds are perceived and designed again in the future. Second, for the disabled embodied experience, time is a crucial factor in understanding how designed worlds are inhabited. Third, the BTS ARMY community works to integrate technology throughout their community social experiences and the online/offline divide only becomes apparent when technology breaks down. In finding the experience of technology to be much more ubiquitous, understanding where the body is—especially with regards to the disabled body—becomes much more complicated. In this section, we begin to explore these open areas of inquiry and conclude with a call to future researchers and designers interested in working in the area of large-scale, multi-modality community events.

6.1 Community Redesign

As we have seen in other work in HCI scholarship, communities undertake labor to reappropriate and redesign their community spaces—and the technology mediating those spaces—in order to accommodate community members (*e.g.,* [23, 79]). This labor is necessary, partly because not all bodies were designed for in the first place. Several questions come to mind when examining a designed world through the disabled embodied experience lens: Who was this designed for? What can we learn about designers' biases and intentions from how the environment is built? What is

this designed for? What happens when we fail to design for certain bodies? What happens when the designed embodied interaction brings you "out of the world" instead of "into the world"?

In the case of the in-person concerts in Los Angeles, CA, for example, the stadium itself was hostile for disabled people, exacerbated by stadium employees who were ill-trained and ill-equipped to handle disabled patrons. This was a far different experience from those concerts held in Las Vegas, NV, where staff were trained and the infrastructure better supported a variety of embodied experiences. For the disabled concert-goers attending the Los Angeles concerts, they had to rely on their BTS ARMY community connections to safely navigate the venue—including leveraging online connections through social media platforms and texting where possible. As for the concert itself, the experience was built to be the same—BTS and their team bring their own design elements to create the concert—but the venue impacts how the concert is experienced. The ARMY concert-goers must augment and bring their own elements to the design in order to create a more hospitable designed world. We saw this, for example, when concert-goers had to turn to social media, such as Twitter/X, for onsite information when employees were misinformed, signage was non-existent, and other mobile network connections were down at the venue.

We have seen work that explores how communities appropriate and bring their own technology to spaces to make them more accessible and accommodating for minority bodies, as we saw during the concert events for the disabled ARMY community (*e.g.,* [37, 72, 79]). When this augmentation happens on a personal level, such as wearing an assistive device or excusing oneself to a sensory room, the disabled individual is taking on responsibility and ownership, in a sense, for making a designed world accessible to their body (*e.g.,* [37, 72]. "Whole world" redesign is more commonly seen in digital spaces, such as a game world or virtual world platform, where the community has the ability to augment or even drastically change the built environment (*e.g.,* [10, 79]). However, the community might be severely limited by physical or digital spaces that have an already-built infrastructure. Here, the community has to get creative in its augmentation in order to ensure access.

When the original venues fail to account for the variety of bodies, there is only so much a community can do to redesign a space. The BTS ARMY community could work to rectify misinformation given by the SoFi stadium venue or plan to help each other onsite, but this cannot fully correct the originally hostile environment. Here we see how Garland-Thomson's Theory of Misfitting comes to life in designer's choices in creating a venue that does not only allow for certain bodies to "misfit" but actively harms them [39]. If designers, incidentally required by law, had taken the disabled experience into account in their plans for stadium design or if the staff at the venues were trained with the correct information and how to appropriately assist disabled concert-goers, the community would not have had to undertake so much labor just to enjoy an in-person concert. Similarly, we design different permutations of hybrid experiences for work, school, and leisure especially since the global pandemic in 2020, but many of these experiences fail to account for the disabled embodied experience [23].

Findings show that for concert-goers who had to make these augmentations to their designed world, often on-the-fly, they had to "re-center" themselves to be in the moment in order to fully enjoy the concert experience. Individuals attending these events traveled to the Southwest United States from all over the globe. They spent a considerable amount of resources including money, time, and, in some cases, their own health in order to participate in these community events. We should acknowledge the considerable labor being done by individuals, who are already marginalized in their lived experiences. We see through this research that individuals and their communities having to "fix" the choices by venue designers is yet another way that disabled concert-goers are "brought out" of the concert experience—therefore, not fully participating in the designed world

of the concert. That is, instead of focusing on the concert and experiencing the community event, disabled concert-goers are instead fighting against a venue's clear denial of access.

6.2 Designing in and for Crip Time

Crip Time is the concept of allowing for the body to take the time it needs to complete an objective or task or "rather than bend disabled bodies and minds to meet the clock, crip time bends the clock to meet disabled bodies and minds" [55]. Time plays an important role in the concert-going experience. Not only is time required before, during, and after the concerts, but the perception of time shifts depending on the context of the experience itself. The designed worlds of the concert experience are built for specific experiences of time, although this work shows that this impacts the disabled embodied experience differently than intentioned.

Disabled concert-goers have to plan the concert experience as to maximize enjoyment and minimize harm done to their bodies. For example, planning to avoid long wait times standing in lines to allow time for standing during a concert might be one choice a concert-goer makes. This means missing out on aspects of the concert experience such as purchasing merchandise or photo opportunities and still needing time to rest and recover after the event. For other disabled concert-goers, the physical impact (and time taken) to attend an in-person concert is not feasible. For these concert-goers, the live streamed concerts become their only way to connect with the community and listen to the musicians live. Synchronous activities through various platforms allows people connected online to still feel as part of the concert event—not all of which are sanctioned by the artist or their company. However, the challenges and potential harms are weighed against an opportunity to hear BTS's music live. Many ARMY concert-goers feel this is crucial because of their deep connection to both BTS as artists and BTS's music, which other scholarship has shown ARMY feel the positive impact on their mental health [58].

There are many social, infrastructural, and technological ways designers might incorporate crip time into their designed worlds. For example, allowing those with accommodation needs access to more seating in stadiums that are built with hostile environments meant to keep people moving. Standing for long periods and being sent on a wild goose chase to find accessible entrances does not afford an accommodating concert attendance. Even purchasing ADA tickets was time consuming and frustrating—many people accidentally purchased ADA seats that did not need them, further limiting an already small number of seats to choose from [74]. There was also extra access labor involved in aiding people in reselling their ADA tickets and making sure they went to disabled ARMY who needed them. None of these components—social, infrastructure, or technological—will offer a one-size-fits-all solution on their own. They must be integrated together in order to allow for a more inclusive and accommodating designed world.

6.3 Being in multiple spaces at once: Where is the body?

In designed worlds, we are potentially participating in multiple embodiments of ourselves simultaneously, attending to these various experiences with more or less engagement for each. For example, in a streamed concert, a concert-goer may be attending to the concert stream, a social media stream and/or private chat messages to engage with their social community networks, a separate social media stream for on-the-fly community-generated translations, and their physical body at home. Whereas, at an in-person concert, a concert-goer is attending to the concert, the people around them, and a social media stream to stay connected with online friends. In each of these cases, the ubiquitous technologically-mediated experience is not readily apparent to individual concert-goers until there is a breakdown (either socially, infrastructurally, or technologically). When cell and wifi service both broke down at the in-person concert in Los Angeles, CA, for example, many were cut off from their social connections while trying to navigate the venue on their own or failing to

meet up with people who couldn't connect across the large stadium. For disabled concert-goers this inconvenience of losing one's online social connections becomes an event full of potential to harm, as disabled individuals might be trying to meet up with people who can assist them or use their online networks to find the information they need to advocate for themselves (*e.g.,* when staff misinformed disabled concert-goers about accommodations available at the venue or there was insufficient signage to find the sensory room). This suggests, additionally, a call for understanding designing these spaces with an interdependence lens (*e.g.,* [2, 5, 38])—the social context and a disabled concert-goer's reliance on their social network is just as crucial to the concert-going experience as physical access.

In many designed worlds, this seamless coexistence of digital/physical and online/offline facilitates multiple avenues of access to social experiences and activities. As we found in the BTS ARMY community, communities now work to create these seamless points of access. In-person events often still include online interactions, for example. A person might simultaneously be engaged in a concert in-person while sending a live stream to their social media feed or to their friends. The central point of concern in these designed experiences is feelings of being socially engaged. The embodied experience is in many ways also a social experience, much as other work has started to point towards [13]. The disabled embodied experience, in particular, is influenced by the social. How, when, and with whom a disabled individual engages is often pre-determined by the choices of the designer (and their creation of access or not) and the other individuals inhabiting a space. This means disabled people are relying on designers and community members alike to not be ableist in order to access a full range of social experiences.

There are many ways to conceptualize worlds, as we have seen from the work referred to and outlined in this paper. In the BTS song, 소우주 (Mikrokosmos), the lyrics discuss how we are all a part of this world, but also are each our own worlds within ourselves. One translator explains, "소우주 literally means small (소:小) universe (우주:宇宙). It refers to something that is smaller than the universe (or is a part of it) yet is a universe by itself - like humans that belong to the world yet are small worlds by themselves" [28]. If we understand the concept of 'Mikrokosmos' to be another way to interpret 'worlds', then worlds can be both designed and not designed. Some worlds have intentional sociotechnical infrastructure, which is of particular interest to HCI and CSCW audiences, and some are further designed to be their own microcosms of communal activity—designed worlds. We each inhabit many worlds at once, including each of the sociotechnical spaces, or even designed worlds, that we move through and connect with one another. Finally, this drives us to the last question of this paper: if we are inhabiting multiple worlds—designed or not—at once, where is the body? Or maybe we want to ask the question, do we have multiple bodies in which we are inhabiting multiple places?

In some worlds, perhaps, a person may find themselves more disabled than others. A live streamed concert from the comfort of one's home, with their own accommodations and comforts, might be a completely accessible experience as opposed to an in-person concert with limited accommodations. With each variation and modality, different embodied experiences become enabled or dis-abled [76]. The accessible embodied experience allows an individual to be present in the designed world, engaging with others, expressing one's own identity, and enjoying the experience. As we alluded to in the Findings, in Section 5.3, dependent on the space and designed world infrastructure, the embodied experience might have one's physical body and their *imagined* body doing completely different things. We can see this in previous literature on avatars in digital worlds where a disabled individual can experience mobility their physical body might be unable to do, for example [8, 10, 76, 90]. A concert-goer might both experience their physical body in a space, but also whatever their imagined body is doing as well. The embodied experience transcends the physical and digital as dichotomies to blend the boundaries into a whole embodied experience of a

particular world. How each place is designed will impact one's access to the space. Researchers and designers of accessible and assistive technologies are our first line of hope in creating more accessible, inclusive community spaces. However, they should not be our last.

In conceptualizing designed worlds and interrogating the ways in which disabled individuals labor in order to "fit," we hope to open new lines of design that prioritizes these disabled embodied experiences that are not only for productivity or improvement, but also in areas of leisure and enjoyment. Understanding the designed world's impact on the (disabled) embodied experience is the first step in designing more accessible, inclusive futures.

7 Conclusion

This study focused on a series of music concerts which, while nuanced and complex as it relates to its modalities and the embodied experience of its audience, could be considered to be a fairly straight forward example of a large scale community event. The community attends the event, observes the concert and participates according to specific protocols and scripts that are well known and sometimes rehearsed in advance. They use technologically mediated ways of managing their social experience as an individual member of the community and to interact with the broader community. Unlike concerts, where the community mainly observes and has simple means of participation, there are more complex events that are of similar scale and size including conferences and other commercial events like industry exhibitions. In contrast, such events require dynamic two-way live interaction on various levels (individual, small-, and large groups), where the interaction is unscripted and in many cases completely without community wide social scripts and protocols.

Our findings demonstrate the level of complexity designed social worlds present and document several of the challenges and opportunities that lie in studying their design and communities to both identify and develop better technologies and integration of technological solutions in creating better and more accessible experiences across not just in-person community members, but also those that attend through other modalities. Our findings suggest that there are a number of ways in which individuals engage with these designed world experiences complicated by having to navigate the environment and its infrastructure, issues of time, and the social experience. Studying best practices, such as those presented by professional technologically mediated productions such as music concerts will be key in exploring how to improve and build more inclusive and accessible modalities for hybrid events. Further, communities have many existing strategies and organization structures to assist its members in various ways, many of which are technologically mediated. Building better hybrid modalities to enable access to inclusive community events is a key design challenge for HCI and beyond. We argue that starting with best practices in spaces that already handle technologically mediated community involvement well is key to building knowledge on how we can move forward and overcome the challenges and complications involved with not just large scale hybrid modalities, but all types.

In this paper, we explored the disabled embodied experience in various designed worlds through the lens of music concerts for the Korean musicians, BTS. What we can see from this work is that technology mediated spaces are everywhere, how we design our spaces matters for participation in the world, and as these technologically mediated interactions become increasingly ubiquitous, we are standing at the crossroads of whether we choose to design for inclusion or exclusion. Grassroots, community-driven support is an important part of the disabled embodied experience, but is a stop-gap (an impressive one!) for inaccessible and oppressive systems. Much more work is needed to ensure that concerts, and other hybrid community events, are inclusive and accessible to as many people as possible.

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