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# Infrastructures for Virtual Volunteering at Online Music Festivals

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Volunteering benefits recipients, volunteers, communities, and society, while digital technologies establish new opportunities for virtual volunteering. We describe how volunteers transitioned the UK's long-established Oxjam grassroots music festival online in response to the COVID pandemic, delivering a local pilot before scaling up nationwide. We adopt an infrastructural perspective to reveal how two teams of volunteers defined a flexible festival format, knitted together diverse technologies into a technical platform, and operated this to deliver the festival. We highlight the need for teams of volunteers to orchestrate both audience and performer trajectories through festivals. We argue for deliberately designing in volunteer labour rather than automating it out by translating traditional roles online while defining new digital ones. We propose to make these roles rewarding through a more social volunteer experience, including privileged backstage access. We highlight the challenges of using social media for such events, including complying with algorithmic policing of rights.

CCS Concepts: • **Human-centered computing** → **Human computer interaction (HCI)**; **Empirical studies in HCI**;

Additional Key Words and Phrases: Volunteering, Music Festivals, Virtual Volunteering, Orchestration, Communities, Copyright, Performing Rights, Audience, Performers, Trajectories, COVID-19 Pandemic

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## 1 INTRODUCTION

In 2020, the volunteers who run the Oxjam music festival—a longstanding grassroots music festival that takes place in towns and cities across the UK each year to raise money for the international charity Oxfam—faced a difficult challenge. How would they respond to the global COVID pandemic and consequent lockdowns in the UK that prohibited face-to-face music festivals? Their answer was to head online. Over the course of nine months, they innovated an online festival format, assembled available technologies into a supporting platform, and organised a team of human volunteers to deliver two iterations of their festival: one centred on a local community in a single town, and the second scaling this up to become a national event that connected communities across the country.

Members of our research team were already involved in Oxjam as community volunteers and so offered to help. This provided us with a unique opportunity to experience and shape the online festival from the inside, helping to design and deliver it while simultaneously studying it using a mixed methods approach. In what follows, we reveal how volunteers, including ourselves, co-designed the new online festival and subsequently orchestrated it as a live event.

Beyond documenting an example of staging a complex online collaborative event, our study speaks to how digital infrastructures can support volunteering as a valuable and rewarding aspect of life for many people with important benefits for individuals, local communities, and wider society [12] [35] [60]. Volunteering is an emerging theme within CSCW where previous studies have revealed how digital technologies are transforming the practice, from the adoption of volunteer management platforms [28] to new opportunities for virtual volunteering [31], and have highlighted the complex nature of volunteer infrastructures and both the opportunities and challenges of using social media for volunteering [58].

We contribute to this growing body of work in three ways. First, we clarify the nature of infrastructures for virtual volunteering at online festivals, specifically how they combine diverse technologies and volunteer roles through processes for orchestrating audience and performer trajectories. Second, we argue for the unusual strategy of deliberately maximising opportunities for human labour in such infrastructures rather than automating them out and explain how to ensure that such opportunities are suitably rewarding. Third, we reflect that while it can be attractive to use social media platforms to deliver online festivals, this raises significant challenges in delivering a consistent user experience and complying with the opaque algorithmic policing of copyright and performing rights.

## 2 RELATED WORK

We review related work in five parts: previous research into online performance; the nature of volunteering in general; volunteering at music festivals specifically; volunteering and digital technologies; and the concept of infrastructures for volunteering that we build on.

### 2.1 Online performances

The global COVID pandemic has increased interest in live streaming and online performance. Haferkorn et al. [22] investigated musicians’ practices and audiences’ response to livestreaming during the pandemic year March 2020 to March 2021 in the UK, finding that 63% of the 707 participating musicians had livestreamed a performance at least once and 10% over 40 times, while

83% of audience members had attended a livestreamed concert either before or during the pandemic. They highlighted livestreaming's positive impact on accessibility, enabling the disabled, vulnerable, and people with little disposable income to attend music events they could not have otherwise; that audiences were willing to pay, although income is usually less than face-to-face performances and most musicians were disappointed with the income; and that both performers and audiences agreed that livestreaming is here to stay post-pandemic. They noted that Facebook was the platform most commonly used by the participating musicians, but that large number could not engage in livestreaming due to lack of technical knowledge.

A recent study of how traditional folk clubs moved their activities on-line during the global pandemic revealed how participants appropriated existing social platforms including Zoom and Facebook to innovate a new format that mixed live and pre-recorded content. The study reported how traditional musicians adopted new digital practices such as the use of visual backdrops and group edited videos, but also how their traditional practices were in turn influenced by their choice of technologies, for example through a perceived pressure to keep producing new material rather than repeating previous tunes and songs as would normally happen when face-to-face [7].

Previous CSCW research has explored how digital technologies can enhance audience interaction with live performance, including delivering interactive concert programmes on personal devices [6]; contributing to shared visual projections by drawing using mobile phones and dancing [48]; being directed to film the performance from different angles [47]; and the wider user of social media around festivals [25]. One relevant concept to emerge from this work is that of designing an extended audience journey through interactive performances, spanning ticketing, pre-show activities, intervals, and even post show reflection, beyond those moments when the show is occurring onstage. This mirrors wider discussions of designing trajectories through mixed reality performances that involve both online and conventional face-to-face audiences and performers [4].

A second relevant body of work has explored staging various kinds of performance in online virtual worlds including poetry slams [6] [24] and so called inhabited television shows [20]. Studies of these have foregrounded the importance of the behind-the-scenes 'orchestration' required to deliver a performance, and that may be made more or less visible to audiences, for example by having invisible virtual backstage areas [17].

## 2.2 The nature of volunteering

Our paper focuses on how a community of volunteers delivered an online festival which leads us to consider the nature of volunteering. This is a widespread and complex phenomenon that has been extensively studied within social science, economics and psychology among other disciplines. Definitions of volunteering emphasise that it is a non-obligatory, prosocial activity in which "time is given freely to benefit another person, group or cause" [60] with "no expectation of pay or other material benefit" [35]. Dekker and Halman [16] propose that volunteering is carried out for the benefit of others, specific organisations or society, is unpaid, and occurs in an organised context. Brown [10] and Sajardo and Serra [46] underline the economic value created through volunteer labour. However, volunteering is widely seen as benefitting volunteers too. Meier and Stutzer [35] claim that volunteers are more satisfied with their lives than non-volunteers. Wilson [60] highlights positive effects of volunteering on life-satisfaction, self-esteem, self-rated health, educational and occupational achievement, functional ability, mortality and reducing the likelihood of young people engaging in problem behaviours such as school truancy and drug abuse. Clary et al.'s Volunteer Functions Inventory [12] classifies potential benefits to volunteers as: reflecting personal values towards groups or society as whole; learning skills and gaining new perspectives; career development; the social experience of working with friends; protection from loneliness;

escape from work and one's own problems; assuaging guilt about being more fortunate than others; and feeling better about oneself and enhancing self-esteem.

### 2.3 Volunteering at festivals

As with volunteering in general, there are various motivations for volunteering at music and other cultural festivals. In exploring volunteering at a Norwegian jazz festival, Elstad [19] discovered that social aspects of volunteering such as socialising with like-minded people was a key motivation, and that volunteers with altruistic motivations were the most likely to return. On the other hand, Baron and Rihova [3], investigating volunteering at Edinburgh Magic Festival, found that skills development with the view of improving employability was the main motive for younger festival volunteers. Jensen and Buckley [27] focus on the important role of student volunteers in UK festivals, highlighting how they “inhabit the interstices of festivals, fulfilling crucial roles in the spaces between paid staff's capabilities and responsibilities” and are frequently motivated by skills and career development.

Several studies have revealed tensions in festival volunteering. Toraldo et al. [55] discuss how volunteering is professionally organised, with volunteers recruited by charities to work for major commercial festivals in a variety of roles including stewarding (managing flows of visitors around a festival site), bar work, serving on food stalls, litter picking and recycling. They highlight the ‘Janus-faced’ nature of such volunteering, which balances both ‘symbolic’ and ‘economic’ characteristics. Symbolic aspects come to the fore when volunteers describe their work as being enjoyable or consider themselves as part of a collective, while economic aspects prevail when the “volunteer workforce is productively harnessed by for-profit providers,” and volunteers view their work as “drudgery in exchange for subsidised tickets”. A subsequent paper highlights the tension between volunteers paying deposits to secure opportunities to work at major festivals and the positive feelings of community among volunteers, noting how festival organisers foster this ‘communitas’ through dedicated camping areas, allocating friends to common shifts, and providing passes that give privileged access to backstage areas [56]. Clayton [13] similarly highlights the tension between volunteers supporting the wider cause and getting something for themselves and note the challenge of gaining the continuance commitment that leads experienced volunteers to return in future years. Ragsdell et al. [43] elaborate the importance of sharing tacit knowledge among volunteers, but also how this is challenging as festivals are sporadic and rely on volunteers with varying levels of continuance commitment.

### 2.4 Volunteering and digital technologies

There is a growing body of research into digital technologies and volunteering. One thread focuses on Volunteer Management Systems (VMS), digital platforms that support nonprofit organisations in recruiting and managing volunteers. Kapsammer et al. [28] identify three common weaknesses of VMS: data being stored in a proprietary manner; recommendations not being based on competencies and social relationships; and a lack of long-term mechanisms for sustaining personal development. Thomas et al. [54] argue that the design of VMS should better bridge the gap between the expectations of volunteers and the realities of volunteer roles.

A second thread of research—one that is directly relevant to our paper—concerns how digital platforms stimulate new opportunities for virtual volunteering. Liu et al. [31] note how virtual volunteering has emerged as a by-product of the digital transformation brought about by Web 2.0 and social media. Cravens [15] highlights virtual volunteering tasks such as translation, web admin, data analysis, online discussion facilitation, mentoring and promotion of social issues. Others explore the virtual volunteering involved in contributing to Wikipedia entries and moderating of digital communities [2, 32, 45].

A significant kind of virtual volunteering that has emerged in recent years, tackles crisis response through crowdsourcing digital mapping and other online data gathering. Park and Johnston [38] introduce a framework for digital volunteer contributions in crisis response in terms of: individual factors (values, enjoyment, career development, learning opportunities, sociality, recognition, reputation); organisational factors (openness, diversity, decentralised structures, agility and adaptation, mutual learning, crowdsourcing); technical factors (ICT & virtual organisations, advanced computation); and task factors (including mapping and disseminating).

Virtual volunteering brings challenges as well as opportunities. Murray and Harrison [36] raise concerns about the shortage of volunteer work that lends itself to being carried out virtually. Piatak et al. [40] highlight the digital divide as a key barrier that may exclude potential volunteers from taking up new opportunities. In discussing how volunteering has transitioned online in response to the global COVID-19 pandemic, Lachance [29] highlights three key challenges: recruitment (the need to consider new roles and recruit online); engagement (the need to compensate for virtual communication at a distance); and retention (the need to create longer terms roles in areas such as strategy, marketing, policy development, project management, editing and proofreading).

One challenge of relevance to our paper concerns the use of social media. Volda et al. [57] studied how volunteer coordinators working for non-profit organisations (NPOs) view the use of social media to support bridge-building work between their various constituencies. While one might expect social media to be appropriate to such work, they in fact reported three notable challenges: the co-ordinational overhead of having to work through social media ‘point persons’ and gatekeepers within the organisation who often had a more marketing role; mismatches between the design of bespoke volunteering social media sites by third parties and coordinators actual requirements; and problems arising from the wide distribution of notices on ‘all call’ media, including potentially attracting too many volunteers and/or inappropriate volunteers who then need to be involved in some way. However, they also note opportunities for using social media including: promoting deeper engagement with and fostering community among current volunteers, while reaching out to new demographics of volunteers.

## 2.5 Infrastructures for volunteering

In a subsequent diary study of how volunteers themselves (rather than volunteer coordinators) use digital technologies, Volda et al. [58] reveal how they appropriate a variety of existing technologies such as email lists, productivity software, spreadsheets, documents, and forms. They employ the concept of “infrastructure”—mutually constituted interdependent technological and social structures—to describe the ad-hoc assemblages of human volunteers and supporting tools, emphasising the importance of social structures in volunteer work and noting how volunteers often appropriate existing infrastructures for their own purposes rather than employing bespoke technologies. They also discuss how appropriating social media platforms can be problematic due to not being able to opt out, distraction, “noise” and even disempowerment.

This concept of sociotechnical infrastructures will provide a lens for viewing our own study below. Neumann and Star [37] are credited with introducing the idea of infrastructures to the field of design, emphasising how their relational nature incorporates human, social and technological elements to make up a system as a whole. Star and Bowker [50] identify eight salient features of infrastructures: embeddedness, transparency, reach or scope, learned about as part of membership, links with conventions of practice, embodying standards, being built on an installed base, and becoming visible on breakdown. The idea of infrastructures has been explored in the context of civic engagement [58], health care [49], community networks [14], online library systems [37], work infrastructures [41, 49] and gas suppliers [39].



Infrastructural inversion, as introduced by Bowker [9] and expanded on by Star and Ruhleder [51] involves foregrounding infrastructural elements that usually reside in the background, drawing attending to the mundane, routine and unnoticed supporting work that enables infrastructures to function. Pipek and Wulf [41] refer to ‘infrastructuring’ as a way to gain design insights from the visibility created in situations where infrastructures break down. Finally, returning to Volda et al.’s [58] discussion of infrastructuring in relation to volunteering, sociotechnical infrastructures are often notable precisely because they are typically not noted, requiring infrastructural inversion to subvert the conventional figure/ground relationship.

To summarise related work, previous research into online performance reveals a growing practice of livestreaming (in part driven by the pandemic) alongside a recognition of the CSCW challenge of orchestrating audience journeys. Previous research into volunteering reveals diverse motivations among volunteers, specific tensions surrounding volunteering at conventional music festivals, and also how digital technologies introduce new opportunities for virtual volunteering. Finally, the concepts of infrastructures and infrastructural inversion provide a lens for better understanding complex collaborative endeavours involving digital technologies, including volunteering.

### 3 CONTEXT AND APPROACH

#### 3.1 Context

The context for our research is Oxfam, an annual programme of grassroots music festivals that has been running in the UK since 2006 with the aim of raising money for the global charity Oxfam. Oxfam takes the form of a series of ‘takeovers’ in which volunteer teams across the UK takeover pubs, bars, cafes and other small venues in their towns to stage fundraising gigs featuring local acts. These local volunteer teams are supported by a small national team of community engagement managers within Oxfam who help recruit and train local festival managers and provide advice. 10-30 local takeovers across the UK each year range in scale from one evening in a single bar to staging a day-long festival that spreads across multiple venues in a town. Our engagement began with one particular Oxfam takeover, <Anonymised> Oxfam, a longstanding event typically spanning 15 venues, hosting over 70 acts, selling over 1,000 tickets and raising over £15,000 for Oxfam annually. This is delivered by a core production team of approximately 10 volunteer organisers, supplemented by a further 60-80 volunteers on the day to help manage venues and audiences.

As the global COVID pandemic spread in early 2020 and lockdowns were introduced across the UK, Oxfam, like many festivals and cultural events worldwide, faced the challenge of whether and how to deliver a festival. The national Oxfam team and local <Anonymised> Oxfam team drew up plans to stage an online Oxfam festival which unfolded in two phases. First, the <Anonymised> Oxfam volunteer team staged a local version in August 2020 (called the Local Festival throughout this paper). The national Oxfam team then expanded this to encompass five local Oxfam groups throughout the UK into a UK-wide festival in November 2020 (the National Festival).

There was already an established history of engagement between our research team and Oxfam prior to the pandemic. One researcher had served on the core organising team for the festival for nearly ten years, a previous PhD student had developed the festival website and content management system, and several others lab members had been involved as volunteers over the years. Our involvement in transitioning the festival to an online format was therefore a natural extension of this existing collaboration, motivated in large part by the desire to help continue to deliver the festival, but also opportunistically recognising the potential to acquire new research insights. Thus, we were acting as both participants and researchers. Technically, we did not develop or deploy any new tools, but rather were closely involved in reviewing and selecting existing ones and working with the other volunteers to knit them together into a viable festival platform. This

afforded us a close-up inside view of key design decisions, though this necessarily introduced a degree of subjectivity in terms of our own personal involvements that we have aimed to recognise in our analysis. This ‘deep hanging out’ of the volunteers generated knowledge about the emergent experiences of both the research team and other volunteers, who engaged in reflection individually and collectively to reveal their multiple realities [59].

### 3.2 Method

Methodologically, we position our approach as being one of Performance-led Research in the World in which researchers engage with artists to create, deploy and study bona fide public performances that are experienced by public audiences [5]. This falls under the umbrella of Research Through Design, a broadly practice-led stance on research in which new knowledge emerges from reflections on practice [62]. Being ‘performance-led’ means that the research begins with helping realise the artists’ vision for a new cultural experience. Working ‘in the world’ means carrying out ‘in situ development and engagement with users’ [11], specifically with artists and public audiences in the real-world context of cultural venues such as festivals. Thus, researchers engage in both practical development and study, with the latter involving reflecting on both artistic rationale and audience experience. However, our close involvement in the festival as volunteers also introduces an element of autoethnography into our study, ‘insider ethnography’ that involves ‘self-observation and reflection’ [33] to ‘connect the autobiographical and personal to the cultural, social, and political’ [18].

### 3.3 Data, analysis and ethics

Understanding the diverse activities undertaken by volunteers throughout an extended period of design and delivery required us to employ a mixed methods approach, capturing a variety of data from both events.

Our overview of the design of the festival in Section 4 is based on our own autoethnographic account as participants in the design process. Other (non-researcher) members of the production team were aware of our dual role from the start (as had been the case at previous festivals in what has been a longstanding relationship). Findings from our study were shared and discussed with both the local and national Oxfam teams in the form of slide decks, presentations and a report (an early version of this paper) so as to inform their strategy for future festivals and gain their feedback and approval.

Our overview of audience engagement in Section 5.1 draws on anonymised and aggregated ticket sales data provided by WeGotTickets (an e-ticket platform) and anonymised and aggregated numbers of Watch Party viewers provided by Facebook which reveal broad patterns of engagement with the two events. These are supplemented by responses to an online audience survey that was completed by a self-selected sample of ticket holders after the event, having first read a project information sheet and signed a consent form [anonymized university ethics reference].

Our accounts of the volunteer experience in Sections 5.2 and 5.3 draw on nine semi-structured interviews conducted with Oxfam volunteers (see Table 2) in Microsoft Teams after the events, having first read the information sheet and signed a consent form [anonymized university ethics reference]. The Teams video call interviews were recorded and auto-transcriptions generated. Transcriptions were manually edited to address errors. The interview transcripts were then analysed thematically by a member of the research team to identify instances of interaction between volunteers and audience members and the role that technologies played in shaping them.

Analysis across these data was undertaken by research team members who had volunteered in the relevant roles, guided by our shared thematic focus on volunteer experience, in terms of the roles and processes involved, and the value and distinctiveness of being a volunteer at an online



festival. Several data sessions were conducted, where the emerging set of themes were presented to the wider research team, discussed and refined.

We now present our findings in two parts: the design of the festival as it was intended to run, followed by the experience of the volunteers who delivered it. Although the Local Festival and the subsequent National Festival evolved in an iterative manner, they ended up sharing a largely common platform and volunteer organisation. For ease of understanding and to avoid repetition we consider them together, largely focusing on the final National Festival, but noting key differences from the Local Festival where appropriate.

## 4 THE DESIGN OF THE FESTIVAL

We begin by describing the design of the festival before focusing on the work of the volunteers in staging it. Taking inspiration from the above literature, we view the festival as a socio-technical infrastructure that combined human volunteers, organised into teams of diverse roles, who operated a technical platform, that knitted together diverse technologies.

### 4.1 Format

A key decision from the outset was to combine live streaming and pre-recorded videos. Liveness was considered a premium aspect of the festival experience, though potentially risky due to lockdown rules that, at that time, banned live concerts. Consequently, live performances were delivered remotely and reserved for solo musicians or duos who had established a social ‘bubble’ in accordance with the UK’s lockdown restrictions at the time. Pre-recorded videos allowed larger bands, including choirs, to contribute by stitching together videos from individual musicians performing their parts in isolation, while also providing a safety net of material that could be streamed should live connections fail. The festival encouraged audience participation through online live chat and by interviewing selected audience members from their homes and gardens live ‘on air’. The show was hosted by live comperes who introduced the various contributions and ensured continuity. The Local Festival was broadcast from the garden of one of the volunteers, with performers, comperes and technical team arranged to be socially distanced around the space. The National Festival was broadcast from performers homes, with the show coordinated by a team of volunteers located in our laboratory, set-up to observe social distancing measures in place at the time.

Both National and Local Festivals ran for 10 hours between midday and 10PM, structured around hourly cycles of a live performance, a set of pre-recorded videos, and an audience interview, all linked by the hosts.

The festival was ticketed, with tickets for the Local Festival costing £10 (the same price as the conventional festival) and for the National Festival costing £5 (reflecting the different ticket prices of other local Oxjams).

### 4.2 Platform

Choosing a technical platform proved to be challenging due to a complex mix of requirements:

- Connecting remote performers and audiences.
- Accessible to audiences without them installing new software.
- High quality streaming of live and pre-recorded video.
- Flexible playlists mixing live and pre-recorded video.
- On-stage and backstage communication between audience, performers, and volunteers.
- Purchasing tickets which could be validated ‘on the gate.’
- Operable by volunteers with little technical background and minimal training.

Extensive testing concluded there was no single streaming or social media platform that could meet all these requirements, leading the team to knit together separate services into a bespoke configuration. Various combinations were systematically explored before they alighted on the following:

- (1) The streaming service **StreamYard** provided a backend production environment for capturing and mixing live streams from performers, comperes and audience.
- (2) Streams from StreamYard were sent to a **Facebook watch party**, where they appeared alongside pre-recorded videos in a flexible playlist. This could then be watched live by an audience who could comment and text chat using Facebook's native functionality.
- (3) The watch party was hosted in a **private Facebook group** so that only people who had been admitted to the group (after first presenting their ticket number in a membership request) could watch.
- (4) **WeGotTickets** sold online tickets and distributed joining instructions and ticket numbers to the audience.

The choice of Facebook was debated and transpired to be significant as discussed later. Ultimately, the team felt that Facebook offered a broad reach to its potential audience (both Oxfam and Oxfam already had significant presences), would be familiar to its volunteers, and appreciated the flexibility of the watch party mechanism. However, the team anticipated challenges from the outset:

- Not all potential audience members would have Facebook accounts or be willing to register. They anticipated that many would, and that people would often watch together in co-located groups on a shared device, in which case only one person would require an account.
- It was unclear whether the approach complied with Facebook policy at the time, both in terms of selling external tickets for private group membership, and copyright and performing rights.
- Facebook might change its functionality close to the event without consultation or notice (interestingly, Facebook did drop the watch party facility within the year after the festival).

Early testing also revealed a significant usability challenge that requires some explanation here as it significantly shaped the volunteer roles described below. Testing had revealed the user experience of finding and joining a watch party in a Facebook group to be confusing. The essence of the problem is that any livestreams that appeared in the watch party also directly appeared on the group page (i.e., outside of the watch party). An audience member landing on the group page might easily spot the latter first, click on it, and watch the direct stream rather than entering the watch party proper. This would cause two problems. First, the audience member would not see the pre-recorded videos that appeared in the watch party playlist. Second, they would not be able to chat with others in the watch party.

Despite these issues, the combination of StreamYard, Facebook and WeGotTickets was felt to be the best combination for delivering the festival given the nature of its audience, volunteers and other requirements, and the team believed that they could be managed and mitigated.

### 4.3 Volunteers

Volunteers were grouped into two teams: the Performer Team was responsible for engaging and supporting the artistes that performed at the festival, while the Audience Team supported the audience. Figure 1 shows the key roles involved alongside the technologies that they operated.

The work of the **Performer Team** (shaded blue in Figure 1) began at least six weeks before each event, involving issuing a call for artists, selecting artists from those who responded, arranging the programme, and working with the selected artists to produce pre-recorded videos. It continued after the festival through curation of catch-up websites. These activities were delivered by the

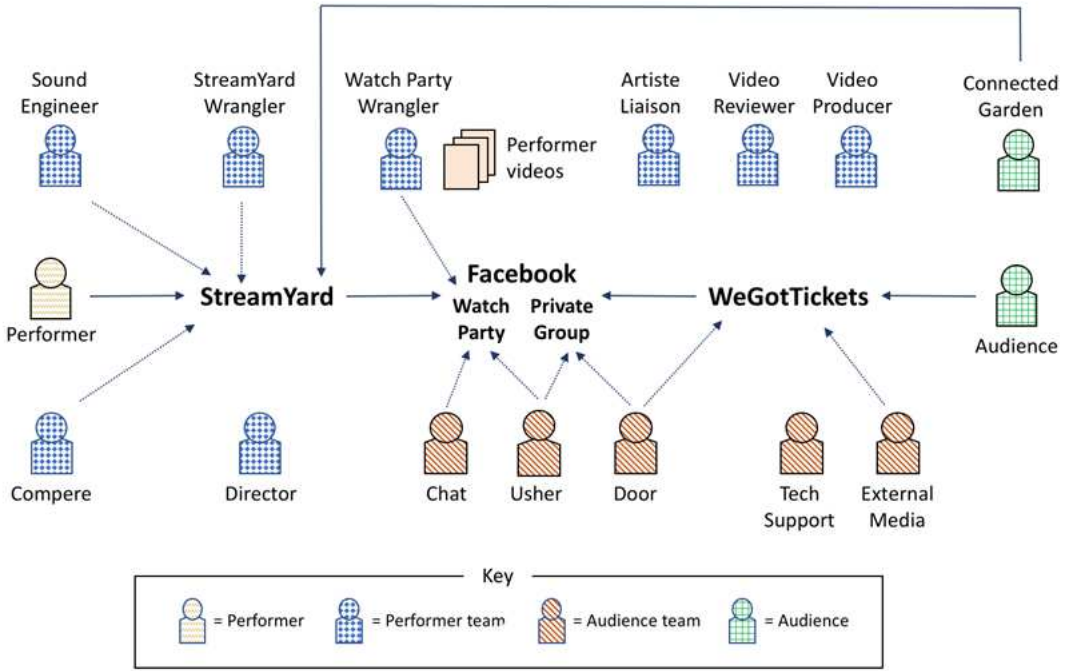


Fig. 1. Performer Team and Audience Team volunteer roles in relation to the technical platform.

**Artist Liaison role**, a panel of **Video Reviewers** and several **Video Producers** who advised performers on making videos, captioned and edited the videos they submitted, and uploaded them to Facebook.

On the day of the festival, the Performer Team was responsible for delivering the streamed content. The **StreamYard Wrangler** operated StreamYard, capturing and mixing streams from the performers, compères and audience members. A separate **Watch Party Wrangler** managed the watch party, dynamically ordering the playlist of live and pre-recorded streams so that the correct videos were shown according to the programme. The **Sound Engineer** managed performers' technical requirements, helping them get a good sound. The **Compere** introduced performers and otherwise hosted the show. The **Director** coordinated these roles to deliver the scheduled programme and dealt with contingencies such as streams failing and performers not turning up. At least two volunteers were trained to cover each live role to allow for breaks during the day. The team was physically co-located in the garden for the Local Festival (Figure 2) and in our laboratory space for the National Festival (Figure 3) during the live events.

The **Audience Team** (orange in Figure 1) was responsible for the audience experience, covering marketing, ticket sales and instructions before the event; managing admission, technical support and live chat on the day; and pointing people to a catch-up experience afterwards. They were mostly located in their own homes, working online. The **Door** checked tickets and managed the Facebook group membership, admitting people to the private group when they presented a valid ticket number. The **Usher** guided those who had joined the group into the watch party, messaging people who were evidently in the wrong place on the group page, e.g., chatting on the page but outside of the watch party. The **Chat** had a dual responsibility for driving and moderating chat



Fig. 2. The Performer Team in the garden at the Local Festival. Left: StreamYard Wrangler (foreground), Comperes (midground), and performer (distance). Right: Watch Party Wrangler.



Fig. 3. The Performer Team in the laboratory at the National Festival. Left: StreamYard Wrangler. Middle: Watch Party Wranglers, Right: Compere.

inside the watch party, i.e., making helpful contributions to the audience chat and dealing with any inappropriate comments. The **Tech Support** role was introduced for the National Festival to help with technical troubleshooting via a separate Facebook page. Finally, the **External Media** role was responsible for monitoring online communications outside of the Facebook group, e.g., watching for comments on other Facebook pages or social media that indicated that people were experiencing difficulties and pointing them towards solutions. As with the Live Team, there was at least a doubling up of roles to allow for a system of shifts. The Audience Team at the Local Festival comprised experienced Oxjam volunteers who had worked together previously and undertaken equivalent roles at physical iterations of the event. In contrast, the National Festival team included first-time volunteer festival managers and professional staff members from Oxfam's Community Engagement Team and Festivals and Events Team.

## 5 THE EXPERIENCE OF VOLUNTEERING AT THE FESTIVAL

We now describe how this design rolled out in practice, especially the virtual volunteering that underpinned its delivery. However, we first offer a brief summary of how audiences engaged with the festival as background context.

### 5.1 A note on audience engagement

The Local festival sold 166 tickets at £10 per ticket which translated into 122 Facebook accounts logging in on the day (some co-located ticket holders shared accounts while others donated by buying tickets without showing up). By comparison the in-person event would normally sell over 1000 tickets at the same price. The National Festival sold 513 tickets at £5 each which converted into 401 Facebook accounts logging in on the day. We don't have comparable sales figures for the in person national event as not all local festivals sell tickets in the same way (some rely on solely on donations) or collect such data. While there was evidently less demand for an online festival experience than a conventional one, these numbers proved sufficient to stress the infrastructure and yield insights into delivering online festivals.

Somewhere between a quarter and a third of tickets were sold on the day, placing pressure on the Door and Usher roles in the Audience Team to rapidly convert new tickets into watching audiences. Figure 4 summarises the numbers of Facebook accounts viewing the Watch Party throughout the two events, according to the Facebook's inbuilt analytics tools, revealing a steady build of the audience over the first few hours of each show. At the peak of the busier National Festival, the team was dealing with 158 simultaneous viewers. The right of the figure shows how in the National Festival there was some audience churn towards the end of the day (between 20:00 and 21:30) when two nationally known acts performed and fans arrived just to see them, requiring the Audience Team to manage new influxes of audience.

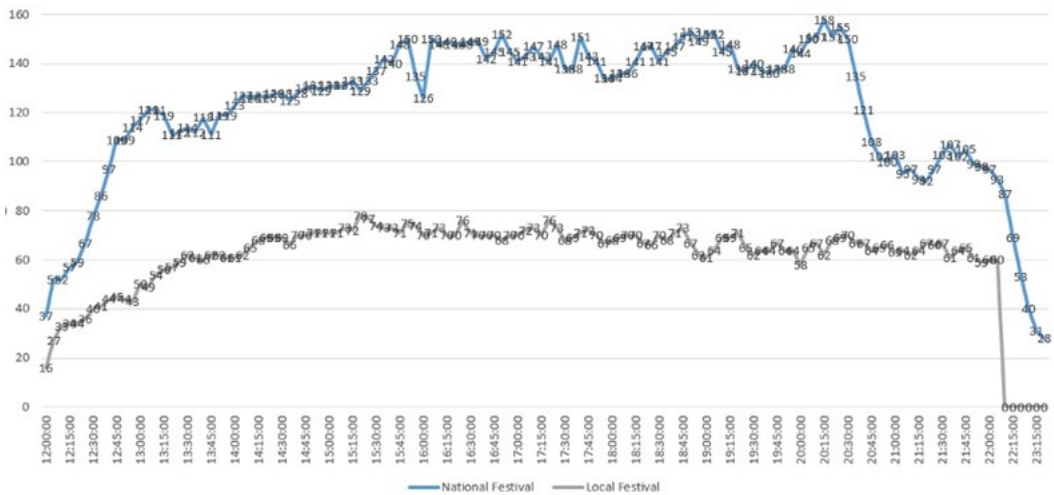


Fig. 4. Numbers of Watch Party viewers through the day for the National Festival (top) and Local Festival (bottom).

A post-event survey completed by 35 respondents for the National Festival and 31 for the Local Festival revealed that the audiences were positive about both the National and Local Festivals. On a five-point Likert scale, 51% strongly liked the mixture of live-streamed and prerecorded video for the National Festival (68% for the Local Festival); 63% strongly liked live streaming from other cities/towns (55% from the Local Festival strongly liked live streams from other people's gardens); and 58% of National Festival respondents had watched or would watch (29% each) the catch-up content after the event. Notably for the work of our volunteers, 11% reported experiencing technical difficulties of some kind.

## 5.2 Performer Team experience

We now consider the activities of the Performer Team, focusing on two key aspects of their volunteer work: the challenges of selecting videos and negotiating rights during the pre-production phase; followed by the challenges of operating the platform to deliver the best possible quality of live streamed show on the day.

*5.2.1 Pre-production challenges including managing rights.* Extensive volunteer work was required over the two months leading up to the day of the festival to recruit performers, assemble the festival programme, edit hundreds of pre-recorded videos, and make these available in Facebook. While important and demanding, this work was, in many respects, recognisably routine in terms of the nature of both festival and media production and the team soon established a workflow of production processes to support it using various standard tools including online documents, spreadsheets, shared storage and video editing tools.

However, an unanticipated issue did emerge which warrants further discussion here. This concerned rights management. As noted earlier, the team was unsure from the outset whether their plans might potentially violate Facebook policies in place at the time and what might happen consequently. Some members had prior experience of watch parties appearing to be automatically stopped due to including a copyrighted video in a playlist. Moreover, the team was concerned that this might potentially extend to performing rights for ‘covers’, i.e., to original performances of copyrighted songs. In the UK, festivals can apply to Performing Rights Society for a license to cover online performance that they host, but this does not cover hosting on social media including Facebook which has its own arrangements. However, Facebook’s policy and mechanisms for complying were unclear to the team, as was the extent of any algorithmic policing. The team was concerned that the outcome might be disastrous, potentially shutting down a festival for which hundreds of people had purchased tickets. While the Local Festival had been willing to run this risk, the National Festival was not and so the decision was taken to ban all ‘covers’, both for prerecorded and live performances. This was a significant step, as local Oxjams often feature ‘covers bands’ and even songwriters often perform a cover or two. Though there were those on the team who felt that the festival should lean towards original material anyway, this decision excluded a set of potential grassroots artists who would normally have contributed to local Oxjams.

*5.2.2 Live-production challenges of delivering a live show.* Given that Oxajm is a live music festival, it was felt to be of paramount importance to stream the highest possible quality audio from performers. For the Local Festival, this involved extensive experimentation with how best to stream from a single stage in a garden, leading to the approach of using a single omnidirectional microphone to capture performances and ensuring that this, along with a webcam, was directly connected (via a laptop) to a wired internet connection. This set-up was operated by the Sound Engineer role who closely coordinated with the Stream Yard Wrangler (collocated in the garden) to monitor the streamed sound and adjust equipment accordingly. This local set-up generally worked well with some audience members commenting on the high quality of the streamed sound.

The National Festival proved to be a far greater challenge as, due to tighter lockdown restrictions in place at the time, performers had to stream from their own homes. They had diverse levels of experience with streaming and equipment to hand. The Sound Engineers conducted technical tests with each performer in the fortnight leading up to the event which in several cases resulted in them shipping equipment (microphones, webcams, and connectors) to performers as well as providing advice. On the day, The Sound Engineer operated a separate StreamYard connection as a private sound check area, from which the performer was directed to a backstage area on the main StreamYard connection. This required extensive coordination with the Stream Yard Wrangler and



introduced an extra risk of losing performers in the transition. Despite these measures, there were still technical problems. The most notable led to one artist dropping out of their performance in the National Festival and a second not being able to complete their set. This required the wider team, including the Director and Watch Party wrangler, to improvise changes to the schedule by playing some prerecorded videos that had been held back in reserve for an ‘after hours’ playlist and asking the comperes to cover with some improvised hosting.

The platform proved largely stable. However, major technical glitches occurred eight hours into both the Local Festival and National Festival, when the connection between StreamYard and Facebook failed. The first time this happened, during the local festival, the Live Team mistakenly attributed the problem to a network failure. After it reoccurred at the National Festival, they realised it was systemic problem in which StreamYard automatically stops its connection after eight hours. In response, the Director instructed the Watch Party Wrangler to quickly move to the next prerecorded video while the connection was re-established, and the schedule was adjusted.

A consistent challenge was an approximately 20 second delay between content leaving StreamYard and being available to the Watch Party. Cutting back and forth between prerecorded to live streams therefore required careful coordination between StreamYard and Watch Party Wranglers to ensure that comperes and performers began 20 seconds before a prerecorded video ended and that videos played out immediately after live segments.

In general, this combination of roles and the flexibility of the platform enabled the Live Team to adapt to negotiate these various issues and the show generally proceeded smoothly (to a level that was noted with some surprise by some audience members). In large part this was due to the colocation of the team which enabled fluid communication, including a degree of tacit coordination as processes became practiced towards the end of each show. Moreover, though stressful at times, being a member of this team was an enjoyable communal experience with a notable sense of occupying a privileged position backstage from which the entire festival could be appreciated. In short, the team felt themselves to be very much at the centre of the action as they negotiated the various technical challenges of delivering the show.

### 5.3 Audience Team experience

The volunteer work of the Audience Team contrasted in many ways. We draw on interviews with Audience Team volunteers as summarised in Table 1 to unpack the challenges of dealing with the audience during both Local and National festivals. The team for the National Event was led by Oxfam staff, who volunteered their time outside of normal working hours for the event, but also included volunteers from local festivals and the University, all of whom were assigned roles and shifts in a rota that covered the 10-hour programme plus an hour beforehand. When ‘on shift’ volunteers logged in with a group administrator Facebook identity, but could switch to their personal profiles to experience the festival as individual audience members at other times. We reveal three key challenges that were negotiated by the Audience Team: bringing the audience into the festival; technical support; and distributed working.

*5.3.1 Bringing the audience into the festival.* As with the Performer Team, work began months before the festival through a marketing campaign and selling tickets, activities that were familiar from the conventional festival and that employed a variety of digital platforms including the festival’s own website and social media. The most notable challenge here involved carefully crafting instructions for joining the festival that were to be sent to the audience via WeGotTickets shortly before the event.

A significant challenge involved admitting those who had purchased tickets into the festival on the day. This required coordination between two key volunteer roles, the Door and Usher.

Table 1. Audience Team Interviewees

| Interviewee | Event             | Affiliation                        | Volunteer role      |
|-------------|-------------------|------------------------------------|---------------------|
| P1          | Local Festival    | <Anonymised> Oxjam volunteer       | Chat                |
| P2          | Local Festival    | <Anonymised> Oxjam volunteer       | Usher               |
| P3          | Local Festival    | <Anonymised> Oxjam volunteer       | Door                |
| P4          | National Festival | Local volunteer festival manager   | Chat                |
| P5          | National Festival | Oxfam staff member                 | Chat                |
| P6          | National Festival | Local volunteer festival manager   | Prerecorded content |
| P7          | National Festival | Oxfam staff member                 | Chat                |
| P8          | National Festival | University research team volunteer | Tech Support        |
| P9          | National Festival | Oxfam staff member                 | Door & Usher        |

Admitting the audience began a couple of hours before the performances, after the Performer Team had first finished starting up the platform and technical tests, and continued throughout the day, sometimes with later peaks as new waves of audience joined (see our previous discussion Figure 4).

The Door collected reference numbers from WeGotTickets, along with references for complementary tickets assigned via individual emails to artists (one each) and volunteers, organising these into a spreadsheet ready to be checked off as requests to join the festival Facebook group were received. Some of those who tried to join the Facebook group did not provide their ticket reference as per the joining instructions, which required the Door to send follow-up messages. ‘A handful of people never responded to my messaging, and are still sitting in the request list! This was the most frustrating thing of the day’ [P3].

Conversely, when someone tried to join with a code that had already been used, they had to be messaged to explain why they were not admitted. An unanticipated use of Facebook’s platform posed an awkward and time-consuming problem: ‘Some things that we hadn’t expected like one of the artists inviting all of his Facebook friends who hadn’t had tickets, so then we had to, well, we started cross checking each one of those and then, you know, none of them had tickets and he’d invited like 160 people who’d all requested to join’ [P9]. This artificial demand delayed admittance of ticket holders, some of whom turned to Tech Support for reassurance. At the Local Festival, a single volunteer was responsible for the Door role, which limited their ability to feel part of the wider festival: ‘The event appeared to be a great success, though because of my continuing role on the door throughout the day, I wasn’t able to properly watch much of it. I could hear some of it as [the Usher] was watching separately on his laptop’ [P3].

Once admitted to the Facebook group, the Usher role then had to guide people into the Watch Party, keeping an eye out for people who appeared to be struggling (e.g., whose chat messages were appearing in the wrong place in the Facebook group) and messaging them individually.

**5.3.2 Providing technical support.** Considerable effort was expended on technical support. Focusing on the Local Festival for a moment, the Chat role transformed being one of facilitating social interaction in the watch party to being one of providing technical support. Messages from audience members experiencing problems might be posted within the group page (monitored by the Usher) or within the watch party chat (monitored by the Chat). Local Festival rehearsals had revealed that the watch party interface did not function consistently across different devices or when using different browsers. The joining instructions advised ticket holders to login to Facebook using Google Chrome, but it seemed that message was not noticed by all; as [P2] put it ‘because there’s no RTFM [read the f\*\*king manual] going on’.

Volunteer attempts to assist were not always well received by frustrated audience members. As a Chat recalled, ‘there was one comment from somebody saying, “well to me that’s just a lot of technical speak saying I’m cleverer than you”’, which ‘wasn’t particularly enjoyable’ [P1]. A particular challenge here was that audience requests for technical help were globally visible as part of the audience chat. On one occasion during the Local Festival when a member of the audience responded rudely in the public chat forum, the Usher’s daughters, who were also in the audience, watching from elsewhere, ‘chipped in and told this guy off and said “he’s trying to be helpful, you know”’ [P2]. The Usher attempted to contact this unhappy audience member privately, by sharing an email address and even a personal mobile phone number, ‘which was probably remiss’ [P2], but never received a response. It was not until later that the Audience Team agreed that this negative comment should be deleted as unacceptable. We note that while stewards at regular festivals may of course have to deal with frustrated festivalgoers, this is not usually conducted over a public PA system in front of the audience as effectively was the case here.

The team’s response to these challenges was to introduce a new Tech Support role for the National Festival, delivered through a separate Facebook page, aiming to take technical discussions off the general audience chat. 28 requests were received, 20 of which were resolved. 19 requests were sent during the first two hours of the festival. Difficulties included accessing the watch party, technical incompatibilities, and oddities within the Facebook ecosystem (namely Facebook ‘pages’ rather than individual accounts trying to join).

**5.3.3 Working in a distributed manner.** In contrast to the relatively smooth and social experience of the Performer Team, the Audience Team encountered a far more challenging environment due to the varied and unpredictable problems raised by the audience coupled with having to work in a distributed manner. The nature and intensity of the challenge initially emerged as something of a surprise during the Local Festival. Due to the unanticipated demands of trying to resolve audience members’ technical difficulties, the Chat, who was supposed to be a link with the Live Team, did not get out to the garden stage until the evening: ‘that was really nice but you know I hadn’t really been able to do that; I was inside and I was getting it through a screen through a delay but really I was preoccupied with other things’ [P1]. By the time of the of The National Festival the team was able to respond by recruiting further volunteers, strengthening their processes, extending audience instructions, introducing a new role and separate channel for technical support, and instigating an open Microsoft Teams call for their own coordination. For the National Festival, the Audience Team evident ‘team spirit’ was scaffolded by a Teams call which was running throughout for all audience volunteers to join when on shift in order to consult with one another. Although the Teams call made it harder for volunteers to engage in the event itself – ‘I might have it on in the background, but then someone would say something on the Teams call, so I was forever muting and going back’ [P9] – it was important to ‘know that there were people to ask’ [P4]. For example, during the admittance delays Tech Support would ‘pass on those specific names to the ticketing team’ via the Teams call, allowing the Door to ‘pick them out of the hundreds of random additions’ [P8]. There

was a marked separation between volunteering and participating in the event, when Audience Team members swapped from the shared Oxjam administrator identity to their own Facebook credentials: ‘probably my comments back to people were different in the evening when I was just watching it to when I had Oxjam festival as part of my header’ [P9]. Despite these innovations, managing the audience remained an intense ride, and while there was undoubtedly a strong sense of camaraderie among the team, the more socially isolated experience appeared to be markedly different from the Performer Team’s privileged position of being at the centre of the action in the control area behind the scenes noted earlier. One Chat role volunteer commented on the invisibility of the effort involved when delivering online events, which seem to rely on a simple internet connection, but in reality, required a lot of planning: ‘we’d done all our prep work and we had the right number of roles, and everyone took that seriously and turned up when they needed to’ [P7]. Unlike at a physical festival where volunteers in high-visibility vests make their presence obvious to all, the work of the Audience Team was largely invisible for much of the time, even to other Oxjam volunteers. The Usher commented: ‘it looked so slick that they probably thought it’s easy’ [P2].

## 6 DISCUSSION

We reflect on how our volunteers were able to deliver two iterations of their online music festival, drawing out three themes of wider relevance to discussions of virtual volunteering in CSCW. We adopt the perspective of sociotechnical infrastructure as introduced in Section 2.5 and previously applied to studies of volunteering and digital technologies [58]. We apply the lens of ‘infrastructural inversion’ [9, 51] to foreground key infrastructural elements that usually reside in the background but become noticeable when things break down [41], which in our case involves highlighting the vital work of human volunteers in innovating processes to make the infrastructure work despite the challenges they encountered. We begin with a summary of our festival infrastructure which we propose provides a template for delivering future online festivals and other cultural events before delving into specific themes.

Our study highlighted three key facets of online festival infrastructure: a festival format that provides the flexibility to mitigate risks and contingencies; knitting together existing technologies into a comprehensive technical platform; and the organisation of human volunteers to operate the platform.

Considering the format, the combination of live and pre-recorded material delivered two key benefits. First was operational flexibility, especially mitigating the risks of live and remote performance. Being able to fall back on a baseline of pre-recorded material provided a safety net for managing all manner of contingencies, from low quality sound to streams failing, to performers not showing up. Second, was a resilience to fluctuating lockdown restrictions, with pre-recorded video allowing individuals and groups to contribute when they could not physically meet. In the worst-case scenario, the festival could have been delivered as an entirely pre-recorded event. In the best, bands and audiences would have been able to physically gather with no restrictions. In between these extremes (where the festival ended up), pre-recorded and live could be flexibly combined to deal with whatever restrictions were in place at the time.

Considering the platform, our volunteers did not develop new technologies, but rather assembled pre-existing ones— Facebook, Streamyard and WeGotTickets – into a configuration that met their needs. The services offered by this technical infrastructure reached far beyond streaming to encompass marketing, ticket sales, donations, admission, audience socialising, and a catch-up service. This ‘live platform’ as we might call it was supplemented by further pre-production technologies to support programming the event, liaising with artistes, offline video production, and general work coordination, including shared online spreadsheets, documents, file stores, and conferencing.

Considering the human volunteers, successfully knitting together the technologies required extensive human labour behind the scenes. It was the volunteers who were the glue in the infrastructure. We have documented the many distinct roles that were involved and how were these were organised into two key teams focused on supporting performers and audience respectively. It is notable that the work of these teams unfolded over months, starting weeks before the festival date and ending weeks afterwards, and that it required training up festival volunteers to work with unfamiliar digital technologies.

Having provided a high-level summary of our infrastructure, we now consider three themes that speak to the design of infrastructures to support volunteering at online festivals.

### 6.1 Orchestrating audience and performer trajectories

Emerging through the process was the realisation that our two teams of volunteers were dedicated to orchestrating two distinct journeys—or trajectories—through the festival, an audience trajectory and a performer trajectory. The Audience Team orchestrated the audience trajectory by steering audience members through learning about the festival, purchasing tickets, being admitted, accessing the live stream, and participating in a performance. Volunteer roles were positioned at key transition points along the way, moments at which (according to our ‘infrastructuring’ perspective), the experience had proven to be particularly vulnerable to breaking down. These key transitional moments were:

- Learning how to participate in the first place, including buying tickets (orchestrated by the External Media role).
- Becoming technically ready to take part (Tech Support role).
- Entering the festival site with a valid ticket (Door role).
- Finding one’s way to a ‘seat’ (into the watch party) (Usher role).
- Successfully and safely participating once there (Chat role).

In turn, the work of the Performer Team was to orchestrate a parallel performer trajectory which involved the following key transitions and supporting volunteer roles:

- Performers learning how to participate (Artist Liaison).
- Testing technical connections and getting a good sound (Sound Tech).
- Being introduced into the moment of performance, taken out again, and thanked afterwards (combination of Compere and technical Wranglers).

These twin trajectories were carefully synchronised to bring performers and audiences together at exactly the right moment and so deliver a scheduled moment of performance according to the festival programme. This was the responsibility of the Director role.

The idea of designing trajectories through digital performances, including recognising the importance of transitions and orchestration, is already recognised in the literature [4]. However, previous accounts of trajectories have focused on audience trajectories; i.e., they have viewed the primary challenge in interactive performance as being one of steering the audience through the experience [6]. A key contribution of our study is to highlight the parallel performer trajectory that also needs to be orchestrated and synchronised with this. The performer trajectory has emerged as being important in this case because a music festival involves performers turning up to play on the day who have not previously been involved in the design of the event. This contrasts with previous studies where the performers have either designed the show or have been trained up to play their parts through extensive rehearsals. In contrast, like the audience, the performers at a festival are ‘outsiders’ in the sense that they may arrive with little prior expectation, experience or training, and so also need to be rapidly supported through their journey on the day. By implication,

other online festivals, cultural events and perhaps even online conferences will need to put in place infrastructural support for performer trajectories as well as audience ones.

We propose that such trajectories become especially visible as a matter of design and orchestration whenever there is a need to rapidly take outsiders through an experience. Our festival designers recognised the need to explicitly design and orchestrate both audience and performer trajectories as both kinds of participant had to be rapidly integrated into the experience. On reflection, there may well be further classes of trajectory that could also be made explicit and better supported with orchestration? In our festival, the training of volunteers was important but largely implicit. While training was delivered, there was no explicit notion of a volunteer trajectory that would rapidly bring outsiders into the experience as volunteers. Were this festival infrastructure to be repeated, scaled up, and applied to other festivals, then it would be beneficial to identify and support such a trajectory—i.e., to design and orchestrate a volunteer training journey too.

In summary, online festivals should explicitly support carefully designed and orchestrated synchronised audience and performer trajectories, while virtual volunteering experiences in general should support volunteer trajectories.

## 6.2 Creating rewarding opportunities for virtual volunteering

That so many volunteers were required to deliver the festival could be seen as a problem – i.e., the scale of this human labour exposes the infrastructure as being somehow unwieldy or deficient. If adopting such a view, our study could be seen as highlighting design opportunities to remove the need for such apparently excessive human labour by smoothing out workflows and introducing greater automation. Indeed, this has been the prevailing view among much previous research in collaborative systems design, from early attempts at Office Automation [23], through Business Process Reengineering (BPR) [21] to recent attempts to design online workflows [44], for example applying AI to automate elements of music production workflows [34]. While such approaches may adopt sociotechnical perspectives to understand human work, they have been criticised for explicitly or implicitly seeking to reduce jobs, for example BPR being criticized for driving downsizing [42]. We champion an alternative view. While there are undoubtedly opportunities to improve the technology aspects of our infrastructure, we argue that, in the context of volunteering, one should deliberately seek opportunities to introduce more human labour—providing that they are rewarding ones. Our literature review revealed how volunteering benefits recipients, volunteers and wider society and may satisfy diverse motivations. In general, volunteers are looking to donate their time, not to minimise it, or to be paid for it, so there is no pressing human or financial need to reduce labour. Just the opposite. Moreover, even a temporary transition to a way of working (such as taking a festival online) risks losing longstanding volunteers if they cannot carve out opportunities to continue to contribute. Such volunteers might never return, even when the festival resumes its normal form, exacerbating the challenge of continuance commitment faced by volunteer organisations. In short, events that are volunteer-led, or that rely extensively on volunteer labour (as the literature shows even mainstream music festivals often do), need to serve two constituencies, their ultimate audience but also the army of volunteers whose hard-won enthusiasm and skills need to be carefully nurtured. We propose two strategies for maximising opportunities for volunteering: establishing new volunteer roles and transitioning existing ones. Moving the festival online introduced new volunteering opportunities, notably the Wranglers, Chat, Tech Support, External Media (as a live role) and Video Producers. However, existing roles also transitioned online, though were transformed in the process. Sound Engineers, Doors and Comperes were familiar roles at the conventional festival, while a Director would normally keep an eye on the whole festival from behind the scenes. It is striking that an Usher role was still required online, mirroring that of the many Stewards who normally shepherd people around a physical festival



site. Finding online versions of such traditional roles is important for maintaining the continuance commitment of current volunteers whose sustained engagement may already be fragile [13]. We envisage opportunities for scaling up virtual volunteering moving forward. An intriguing possibility is to consider what other traditional festival volunteering roles might also be transitioned online. Toraldo et al. [55] note how serving in bars and food outlets provides opportunities for volunteering at traditional music festivals. Could local volunteers perhaps help deliver food and drink to people at home as part of an online audience experience? This idea was considered at one point by our festival organisers as a way of involving local pubs and cafes whose business was suffering during the pandemic, but was dropped due to lack of time. Volunteers wielding collection buckets are a familiar sight at conventional festivals (including conventional Oxfams); what might their role look like online? What of traditional volunteer roles such as recycling or first-aid? Might we find similar opportunities online—supporting online wellbeing perhaps? However, we are not arguing for the arbitrary imposition of human labour. These new volunteer roles need to be suitably rewarding, meaning that they must satisfy volunteers’ motivations. While our volunteers were driven by diverse motivations (raising money for Oxfam, supporting local music, learning about ICT, and even conducting research) our findings highlight the importance of two in particular. First was the sense of *communitas* gained from being part of a community of likeminded volunteers working closely together. Second was the buzz of being at the heart of an exciting live event. The importance of these motivations is perhaps best seen through their absence, that is by comparing the contrasting experiences of our two volunteer teams. The Performer Team worked closely in shared physical environments (garden and lab) and enjoyed a privileged view of the festival, seeing backstage activity and meeting performers. They were at the epicentre of events. Even when taking a break they could still hang around and witness the action. These powerful benefits were largely denied to the Audience Team who tended to work in isolation and whose audience-facing work often took them away from the festival itself. We foresee opportunities here extend the platform to provide audience team members with privileged access to online backstage areas where they can hang out during breaks, witness the production of the festival, see performers close by, and so experience a deeper sense of being part of the event. In short, all volunteers should be brought inside the world of the festival. Our study also highlighted the challenging nature of the visibility of volunteer work. At times, volunteers were problematically invisible, not being as visibly present as would be conventional festival stewards. At others, their work was too visible, as when technical problems were discussed over public audience chat. Determining an appropriate visibility for volunteer work that is suitably rewarding while not potentially embarrassing is a further important challenge for future festival infrastructures. In light of this discussion, we consider the question of what defines ‘successful’ volunteering. At a basic level, success might be defined as enabling volunteers to carry out roles that successfully deliver an activity. Under this view, the infrastructure we described above did enable successful volunteering, as volunteers were evidently able to deliver the festival. However, a richer and more useful definition of success should also encompass the quality of the volunteering experience – how rewarding is it to the volunteers? While one can argue that all work should be rewarding, we propose that this criterion is especially important for volunteering which it is not financially remunerated and where maintaining continuance commitment can be challenging. We therefore propose four recommendations for supporting ‘successful’ volunteering at virtual events:

- Provide a social experience for volunteers rather than leaving them isolated;
- Bring volunteers directly into the festival environment so that they feel part of the event, including offering access to backstage areas;

- Incorporate roles for volunteers with ‘traditional’ (I.e., non-digital) skills so that they can continue volunteering as the event moves online.
- Establish an appropriate visibility so that volunteers are recognised but without being publicly exposed when dealing with different problems.

### 6.3 Volunteer-led festivals and social media

Voida et al [57] previously discussed the use of social media by volunteer coordinators at non-profit organisations to increase engagement, foster community and reach out to new demographics. They also noted challenges arising from the overhead of working through social media gatekeepers, mismatches between the design of bespoke sites and actual requirements, and problems arising from the wide distribution of notices on ‘all call’ media. Our study extends their observations by focussing on the use of social media by volunteers themselves, specifically to deliver an online event. In so doing, it has revealed further tensions in the complex relationship between volunteering and social media.

It is worth recalling why social media (in our case Facebook) are so attractive: they are already used by many musicians and by a potentially large segment of the audience [22]; they are familiar to many volunteers; they are an existing component of festival marketing; they provide powerful streaming tools and facilities for watching streams together; they may be open to monetisation; they are scalable, reliable, and free to use. This makes them a compelling proposition, but not without problems.

The most obvious challenge concerns the user experience. The nature of such platforms is to constantly refresh their content, forever presenting the audience with new opportunities to explore and share in a somewhat uncontrollable way. Consequentially, they are not always easily customised. Despite providing many options to tailor the appearance and layout of a page, it can be difficult to craft a bespoke, tightly managed, and consistently available audience trajectory. Moreover, the functionality of the platform may shift underfoot in surprising ways. We saw how this slippery user experience made it difficult to deliver a smooth audience trajectory, requiring the support of dedicated volunteer roles to steer people into a Facebook group and watch party.

Less immediately obvious but perhaps ultimately more important was the tension around rights, including both copyright for prerecorded material and performing rights for live performances. Such rights have been a longstanding battleground between media industries, platforms and audiences over decades as documented by media theorist Henry Jenkins [26] in discussions of Convergence Culture and legal scholar Lawrence Lessig’s [30] discussions of the tensions surrounding Remix Culture, both of which highlight how social media platforms both desire but also seek to constrain user generated content. Our study is illuminating in several respects. First were concerns about the increasingly algorithmic policing of rights, with worries that algorithms might shut down the festival while it was happening at a moment’s notice and without recourse. Part of the challenge lay in the lack of transparency of such algorithms—no one was quite sure of their scope or operation. A second was the lack of transparency of policy and corresponding lack of mechanisms to comply with this. Facebook did not appear to offer the kinds of advance set-list documentation and licensing that one normally does for a conventional festival (e.g., through the Performing Rights Society in the UK). Rather, the approach seemed to be to perform and let algorithms monitor the output and decide what to do on the fly. This was too risky a proposition for our festival organisers. The National Festival team were not seeking to freely use, or mashup protected content but wanted to ensure that they were compliant with policies that would be implemented by algorithms, but this proved impossible to achieve, leading to their ‘no covers’ policy even though this would exclude many performers from taking part.

Compounding these challenges was a sense of appearing ‘over the radar.’ In our experience, traditional (offline) grassroots gigs are not always subject to these kinds of performing rights negotiations. It has simply not been feasible or profitable for the music industry to police performing rights for micro-scale amateur gigs; they seem to ‘fall under the radar’. However, there is a sense (even hope) that, through the reach of social media, even microscale grass roots festivals, just might become more visible—i.e., might ‘go viral’.

A radical response to these tensions would be for festival producers to drop social media and create their own bespoke platforms (anecdotally some that we know are currently venturing down this route), but then they face the major challenges of reach, familiarity to audience and volunteers, scale and robustness, and the myriad issues that social media platforms have already successfully tackled. Moreover, developing and sustaining platforms falls far beyond the capability of most any volunteer organisations. An alternative response would be to try and change the social media platforms policies or even the copyright and performing rights policies upon which they are based, but again this would appear to be challenging for volunteer-led organisations to achieve. More feasible perhaps, at least from our perspective, as CSCW researchers, is to influence social media platforms to provide transparent license clearance mechanisms so that users (and indeed designers as noted in [61]) can better understand how to comply with them. Moreover, where these policies are algorithmically policed, platforms should ensure that the scope and operation of their algorithms is also transparent. These ideas seem closer to the remit of CSCW and we hope our paper might help raise their profile with platform developers.

We note a further intriguing possibility—that algorithms might be designed to ‘turn a blind eye’, an idea that has previously been raised in consideration of the operation of crime surveillance algorithms in comparison to the tacit practices of human police officers [1]. Some of the critique of office automation that we touched on earlier centred on the inflexibility of automated solutions compared to often tacit human practices that allow people to ‘rub along’ and get things done [8, 52, 53]. Might algorithms be able to judge what falls under the radar when it comes to policing rights and even other aspects of our lives? We speculate that this might be a crucial step to them finding their place in the world alongside humans as part of all manner of sociotechnical infrastructures.

## 7 CONCLUSIONS

We have shown that delivering large-scale public online events such as virtual music festivals is a complex endeavour, the scope of which extends far beyond live streaming individual performances, to encompass a variety of functions concerned with planning, marketing, ticketing and coordinating both audience and performer experiences. By applying the lens of infrastructuring, we have revealed how successfully delivering them rests upon a complex sociotechnical infrastructure of diverse technologies, volunteer roles, processes for orchestrating trajectories, and a suitably flexible format.

We have argued that, in contrast to conventional approaches to productivity applications that seek to ‘automate out’ human labour as a way of reducing costs and/or increasing scale, it is important to maximise opportunities for volunteer labour by introducing new volunteer roles or transitioning current ones online. Of course, these roles need to be suitably rewarding, reflecting volunteers’ motivations for giving up their time, for example by providing training, a sense of *communitas*, and privileged access behind the scenes.

We have revealed tensions concerning the use of social media platforms to deliver online music festivals. While attractive due to the rich functionality they offer, their increased reach and low cost, they come with potential drawbacks. The user experience can be complex, uncontrollable and shift underfoot. Legal compliance with rights management can be opaque, especially where these are algorithmically policed. This raises a tricky question as to whether current social media

platforms can become friendlier towards volunteer-driven virtual events, or whether NPOs could realistically create their own platforms with similar functionality and reach.

In terms of wider impact, it remains an open question at the time of writing as to how important virtual music festivals will become in the future. While one can imagine that many people will gratefully pivot back to physical festivals once the pandemic recedes, event producers may now recognise the need to ‘future proof’ against recurrences. We also envisage other opportunities in virtual attendance, from increased accessibility to reduced environmental impact. Our view is that future festivals would be wise to continue to explore virtual options, most likely as part of hybrid formats. Finally, we note that our insights might potentially apply to other kinds of events beyond festivals, especially ones that are volunteer led. Conferences, including the one to which we are submitting this paper, would appear to be a case in point, potentially benefitting from kinds of volunteer-led infrastructures that we envisage here.

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## 8 DATA ACCESS STATEMENT

In accordance with University ethics practices and relevant legal requirements, full transcripts cannot be made publicly available as they might compromise participant anonymity.

## REFERENCES

- [1] Mohsan Alvi, Andrew Zisserman, and Christoffer Nellåker. 2018. Turning a blind eye: Explicit removal of biases and variation from deep neural network embeddings. In *Proceedings of the European Conference on Computer Vision (ECCV) Workshops*.
- [2] Yair Amichai-Hamburger, Naama Lamdan, Rinat Madiel, and Tsahi Hayat. 2008. Personality Characteristics of Wikipedia Members. *CYBERPSYCHOLOGY & BEHAVIOR* 11, 6 (2008). <https://doi.org/10.1089/cpb.2007.0225>
- [3] Paul Barron and Ivana Rihova. 2011. Motivation to volunteer: a case study of the Edinburgh International Magic Festival. *International Journal of Event and Festival Management* (2011).
- [4] Steve Benford and Gabriella Giannachi. 2011. *Performing Mixed Reality*. The MIT Press.
- [5] Steve Benford, Chris Greenhalgh, Andy Crabtree, Martin Flinham, Brendan Walker, Joe Marshall, Boriana Koleva, Stefan Rennick Egglestone, Gabriella Giannachi, Matt Adams, Nick Tandavanitj, and Ju Row Farr. 2013. Performance-Led Research in the Wild. *ACM Trans. Comput.-Hum. Interact.* 20, 3, Article 14 (jul 2013), 22 pages. <https://doi.org/10.1145/2491500.2491502>
- [6] Steve Benford, Chris Greenhalgh, Adrian Hazzard, Alan Chamberlain, Maria Kallionpää, David M. Weigl, Kevin R. Page, and Mengdie Lin. 2018. Designing the Audience Journey through Repeated Experiences. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC, Canada) (CHI '18). Association for Computing Machinery, New York, NY, USA, 1–12. <https://doi.org/10.1145/3173574.3174142>
- [7] Steve Benford, Paul Mansfeld, and Jocelyn Spence. 2021. Producing liveness the trials of moving folk clubs online during the global pandemic. *Conference on Human Factors in Computing Systems - Proceedings* (may 2021). <https://doi.org/10.1145/3411764.3445125>
- [8] Jeanette Blomberg and Helena Karasti. 2013. Reflections on 25 years of ethnography in CSCW. *Computer Supported Cooperative Work: CSCW: An International Journal* 22, 4-6 (aug 2013), 373–423. <https://doi.org/10.1007/S10606-012-9183-1>
- [9] Geoffrey C Bowker. 1994. Science on the run: Information management and industrial geophysics at Schlumberger.
- [10] Eleanor Brown. 1999. Assessing the value of volunteer activity. *Nonprofit and Voluntary Sector Quarterly* 28, 1 (1999), 3–17. <https://doi.org/10.1177/0899764099281001>
- [11] Alan Chamberlain, Andy Crabtree, Tom Rodden, Matt Jones, and Yvonne Rogers. 2012. Research in the wild: Understanding ‘in the wild’ approaches to design and development. In *Proceedings of the Designing Interactive Systems Conference, DIS '12*. 795–796. <https://doi.org/10.1145/2317956.2318078>

- [12] E. Gil Clary, Robert D. Ridge, Arthur A. Stukas, Mark Snyder, John Copeland, Julie Haugen, and Peter Miene. 1998. Understanding and assessing the motivations of volunteers: A functional approach. *Journal of Personality and Social Psychology* 74, 6 (1998), 1516–1530. <https://doi.org/10.1037/0022-3514.74.6.1516>
- [13] Diana Clayton. 2016. Volunteers' knowledge activities at UK music festivals: a hermeneutic-phenomenological exploration of individuals' experiences. *Journal of Knowledge Management* 20 (2016), 162–180. Issue 1. <https://doi.org/10.1108/JKM-05-2015-0182> Copyright - © Emerald Group Publishing Limited 2016 Last updated - 2022-11-10 SubjectsTermNotLitGenreText - United Kingdom-UK.
- [14] Stefano Crabu and Paolo Magaudo. 2018. Bottom-up Infrastructures: Aligning Politics and Technology in Building a Wireless Community Network. *Comput. Supported Coop. Work* 27, 2 (apr 2018), 149–176. <https://doi.org/10.1007/s10606-017-9301-1>
- [15] Jayne Cravens. 2006. Involving International Online Volunteers: Factors for Success, Organizational Benefits, and New Views of Community. *The International Journal of Volunteer Administration* Volume XXIV, Number 1 (2006), 15–23. [http://www.ijova.org/PDF/VOL24\\_NO1/IJOVA\\_VOL24\\_NO1\\_Intl\\_Online\\_Vols\\_Jayne\\_Cravens.pdf](http://www.ijova.org/PDF/VOL24_NO1/IJOVA_VOL24_NO1_Intl_Online_Vols_Jayne_Cravens.pdf)
- [16] Paul Dekker and Lock Halman. 2005. *The value of volunteering. Cross-cultural perspectives.*
- [17] Adam Drozd, John Bowers, Steve Benford, Chris Greenhalgh, and Mike Fraser. 2001. *Collaboratively Improvising Magic.* Springer Netherlands, Dordrecht, 159–178. [https://doi.org/10.1007/0-306-48019-0\\_9](https://doi.org/10.1007/0-306-48019-0_9)
- [18] Carolyn Ellis. 2004. *The ethnographic I: A methodological novel about autoethnography.* Vol. 13. Rowman Altamira.
- [19] Beate Elstad. 2003. Continuance Commitment and Reasons to quit: A study of volunteers at a jazz festival. *Event Management* 8 (01 2003), 99–108. <https://doi.org/10.3727/152599503108751757>
- [20] Chris Greenhalgh, Steve Benford, Ian Taylor, John Bowers, Graham Walker, and John Wyver. 1999. Creating a Live Broadcast from a Virtual Environment. In *Proceedings of the 26th annual conference on Computer graphics and interactive techniques*, 375–384.
- [21] Varun Grover, Seung Ryul Jeong, William J. Kettinger, and James T.C. Teng. 1995. The Implementation of Business Process Reengineering. *Journal of Management Information Systems* 12, 1 (1995), 109–144. <https://doi.org/10.1080/07421222.1995.11518072> arXiv:<https://doi.org/10.1080/07421222.1995.11518072>
- [22] Julia Haferkorn, Brian Kavanagh, and Sam Leak. 2021. *Livestreaming Music in the UK: A Report for Musicians.* <https://livestreamingmusic.uk/report/>
- [23] Rudy A Hirschheim. 1986. *Office automation: A social and organizational perspective.* John Wiley & Sons, Inc.
- [24] John A Hughes, Wolfgang Prinz, Tom Rodden, Kjeld Schmidt, Steve Benford, Chris Greenhalgh, Dave Snowdon, and Adrian Bullock. 1997. Staging a public poetry performance in a collaborative virtual environment. In *Proceedings of the Fifth European Conference on Computer Supported Cooperative Work*. Springer, 125–140.
- [25] Sue Jamison-Powell, Lucy Bennett, Jamie Mahoney, and Shaun Lawson. 2014. Understanding In-Situ Social Media Use at Music Festivals. In *Proceedings of the Companion Publication of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing* (Baltimore, Maryland, USA) (CSCW Companion '14). Association for Computing Machinery, New York, NY, USA, 177–180. <https://doi.org/10.1145/2556420.2556503>
- [26] Henry Jenkins. 2006. *Convergence culture : where old and new media collide.* New York University Press, New York.
- [27] Eric Jensen and Nicola Buckley. 2011. The role of university student volunteers in festival-based public engagement. *Bristol: National Co-ordinating Centre for Public Engagement* (2011).
- [28] Elisabeth Kapsammer, Eugen Kimmerstorfer, Birgit Pröll, Werner Retschitzegger, Wieland Schwinger, Johannes Schönböck, Nikolaus Dürk, Gustavo Rossi, and Silvia Gordillo. 2017. iVOLUNTEER: a digital ecosystem for life-long volunteering. In *Proceedings of the 19th International Conference on Information Integration and Web-based Applications & Services*. 366–372.
- [29] Erik L Lachance. 2021. COVID-19 and its impact on volunteering: Moving towards virtual volunteering. *Leisure Sciences* 43, 1-2 (2021), 104–110.
- [30] Lawrence Lessig et al. 2008. *Remix: Making art and commerce thrive in the hybrid economy.* Penguin.
- [31] Helen K. Liu, Yvonne D. Harrison, Jackie J. K. Lai, Grace L. Chikoto, and Karina Jones-Lungo. 2016. *Online and Virtual Volunteering.* Palgrave Macmillan UK, London, 290–310. [https://doi.org/10.1007/978-1-137-26317-9\\_14](https://doi.org/10.1007/978-1-137-26317-9_14)
- [32] Jeff Loveland and Joseph Reagle. 2013. Wikipedia and encyclopedic production. *new media & society* 15, 8 (2013), 1294–1311.
- [33] Garance Maréchal. 2010. Autoethnography. *Encyclopedia of case study research* 2 (2010), 43–45.
- [34] Glenn McGarry, Alan Chamberlain, Andy Crabtree, and Christopher Greenhalgh. 2021. Placing AI in the Creative Industries: The Case for Intelligent Music Production. *Communications in Computer and Information Science* 1419 (2021), 562–572. [https://doi.org/10.1007/978-3-030-78635-9\\_72](https://doi.org/10.1007/978-3-030-78635-9_72)
- [35] Stephan Meier and Alois Stutzer. 2008. Is volunteering rewarding in itself? *Economica* 75, 297 (feb 2008), 39–59. <https://doi.org/10.1111/J.1468-0335.2007.00597.X>
- [36] Vic Murray and Yvonne Harrison. 2002. VIRTUAL VOLUNTEERING: Current Status and Future Prospects. *Emerging areas of volunteering* (2002), 33–50.



- [37] Laura J Neumann and Susan Leigh Star. 1996. Making infrastructure: The dream of a common language. In *PDC*, Vol. 4. 231–240.
- [38] Chul Hyun Park and Erik W Johnston. 2017. A framework for analyzing digital volunteer contributions in emergent crisis response efforts. *New media & society* 19, 8 (2017), 1308–1327.
- [39] Elena Parmiggiani. 2015. Integration by Infrastructuring: The Case of Subsea Environmental Monitoring in Oil and Gas Offshore Operations. (2015).
- [40] Jaclyn Piatak, Nathan Dietz, and Brice McKeever. 2019. Bridging or deepening the digital divide: Influence of household internet access on formal and informal volunteering. *Nonprofit and Voluntary Sector Quarterly* 48, 2\_suppl (2019), 123S–150S.
- [41] Volkmar Pipek and Volker Wulf. 2009. Infrastructuring: Toward an integrated perspective on the design and use of information technology. *Journal of the Association for Information Systems* 10, 5 (2009), 1.
- [42] Hans Puijt. 1998. Multiple personalities: The case of business process reengineering. *Journal of Organizational Change Management* 11, 3 (1998), 260–268. <https://doi.org/10.1108/09534819810216283>
- [43] Gillian Ragsdell and Allan Jepson. 2014. Knowledge sharing: Insights from Campaign for Real Ale (CAMRA) Festival volunteers. *International Journal of Event and Festival Management* 5, 3 (oct 2014), 279–296. <https://doi.org/10.1108/IJEFM-11-2013-0028>
- [44] Daniela Retelny, Michael S Bernstein, and Melissa A Valentine. 2017. No workflow can ever be enough: How crowdsourcing workflows constrain complex work. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW (2017), 1–23.
- [45] Devan Rosen, Pascale Roy Lafontaine, and Blake Hendrickson. 2011. Couchsurfing: Belonging and trust in a globally cooperative online social network. *New Media and Society* 13, 6 (sep 2011), 981–998. <https://doi.org/10.1177/1461444810390341>
- [46] Antonia Sajardo and Inmaculada Serra. 2011. The economic value of volunteer work: Methodological analysis and application to spain. *Nonprofit and Voluntary Sector Quarterly* 40, 5 (jul 2011), 873–895. <https://doi.org/10.1177/0899764010371233>
- [47] Guy Schofield, Tom Bartindale, and Peter Wright. 2015. Bootlegger: turning fans into film crew. In *Proceedings of the 33rd annual ACM conference on human factors in computing systems*. 767–776.
- [48] Jennifer Sheridan, Nick Bryan-Kinns, Stuart Reeves, Joe Marshall, and Giles Lane. 2011. Graffiti: crowd-based performative interaction at festivals. In *CHI’11 Extended Abstracts on Human Factors in Computing Systems*. 1129–1134.
- [49] Jesper Simonsen, Helena Karasti, and Morten Hertzum. 2020. Infrastructuring and participatory design: Exploring infrastructural inversion as analytic, empirical and generative. *Computer Supported Cooperative Work (CSCW)* 29, 1 (2020), 115–151.
- [50] Susan Leigh Star and Geoffrey C Bowker. 2006. How to infrastructure. *Handbook of new media: Social shaping and social consequences of ICTs* (2006), 230–245.
- [51] Susan Leigh Star and Karen Ruhleder. 1994. Steps towards an ecology of infrastructure: complex problems in design and access for large-scale collaborative systems. In *Proceedings of the 1994 ACM conference on Computer supported cooperative work*. 253–264.
- [52] Lucy Suchman and Eleanor Wynn. 1984. PROCEDURES AND PROBLEMS IN THE OFFICE. *Office Technology and People* 2, 2 (feb 1984), 133–154. <https://doi.org/10.1108/EB022630>
- [53] Lucy A Suchman. 1983. Office procedure as practical action: Models of work and system design. *ACM Transactions on Information Systems (TOIS)* 1, 4 (1983), 320–328. <https://doi.org/10.1145/357442.357445>
- [54] Lisa Thomas, Gary Pritchard, and Pamela Briggs. 2019. Digital Design Considerations for Volunteer Recruitment: Making the Implicit Promises of Volunteering More Explicit. *ACM International Conference Proceeding Series* (jun 2019), 29–40. <https://doi.org/10.1145/3328320.3328368>
- [55] Maria Laura Toraldo, Alessia Contu, and Gianluigi Mangia. 2016. The Hybrid Nature of Volunteering: Exploring Its Voluntary Exchange Nature at Music Festivals. *Nonprofit and Voluntary Sector Quarterly* 45, 6 (may 2016), 1130–1149. <https://doi.org/10.1177/0899764016649688>
- [56] Maria Laura Toraldo, Gazi Islam, and Gianluigi Mangia. 2019. Serving Time: Volunteer Work, Liminality and the Uses of Meaningfulness at Music Festivals. *Journal of Management Studies* 56, 3 (may 2019), 617–654. <https://doi.org/10.1111/JOMS.12414>
- [57] Amy Volda, Ellie Harmon, and Ban Al-Ani. 2012. Bridging between organizations and the public: volunteer coordinators’ uneasy relationship with social computing. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. 1967–1976.
- [58] Amy Volda, Zheng Yao, and Matthias Korn. 2015. (Infra)structures of volunteering. *CSCW 2015 - Proceedings of the 2015 ACM International Conference on Computer-Supported Cooperative Work and Social Computing* (feb 2015), 1704–1716. <https://doi.org/10.1145/2675133.2675133>



- [59] Ben Walmsley. 2018. Deep hanging out in the arts: an anthropological approach to capturing cultural value. *International Journal of Cultural Policy* 24, 2 (2018), 272–291.
- [60] John Wilson. 2000. Volunteering. *Annual Review of Sociology* 26 (nov 2000), 215–240. <https://doi.org/10.1146/annurev.soc.26.1.215>
- [61] Qian Yang, Aaron Steinfeld, Carolyn Rosé, and John Zimmerman. 2020. Re-examining Whether, Why, and How Human-AI Interaction Is Uniquely Difficult to Design. *Conference on Human Factors in Computing Systems - Proceedings* (apr 2020). <https://doi.org/10.1145/3313831.3376301>
- [62] John Zimmerman, Jodi Forlizzi, and Shelley Evenson. 2007. Research through design as a method for interaction design research in HCI. In *Proceedings of the SIGCHI conference on Human factors in computing systems*. 493–502.

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